MILITARY REVIEW

VOLUME XXVII DECEMBER 1947 NUMBER 9

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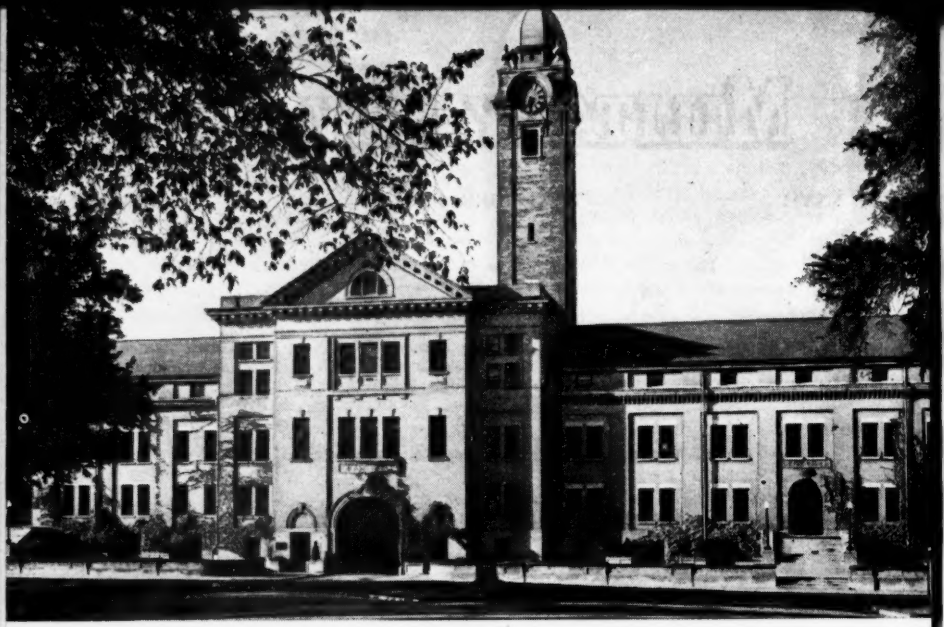
ILITARY REVIEW—Published monthly by the Command and General Staff College at Fort Leavenworth, Kanas. Entered as second-class matter August 31, 1934, at the Post Office at Fort Leavenworth, Kansas, under the ct of March 3, 1897. Subscription rates: $3.00 (U.S. currency) per year for 12 issues. No extra charge for reign postage on new or renewal subscriptions. Reprints are authorized, provided credit is given the "MILIARY REVIEW." C&GSC, Fort Leavenworth, Kansas.



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The Future of
Airborne Operations

Major General James M. Gavin, *U.S. Army*
Commanding General, 82d Airborne Division

AIRPOWER is the decisive element in modern war. By airpower we mean every contribution to waging war that man has created and that can be flown. Bombs, missiles, men, weapons, ammunition, food and all that it will take to fight a future war, must fly. They must be delivered at the scene of combat in sufficient time, quantity, and quality, to win the decision.

The significance of airpower is changing in the current decade. In World War II it meant bombers, fighters, and the supporting reconnaissance and transport aircraft required to fight great air battles. In the future it will certainly mean much more than this. For it will take more than bombers and fighters to fight our aerial battles. Its components will be everything that can be flown that will be needed to fight successfully.

There is a school of thought that holds that future war will be a case of missile versus missile until one side knocks the other side into insensibility. Presumably the side administering the biggest and most effective blow will win. This theory seems to satisfy deep-seated human desire to be both venturesome and quarrelsome without suffering personal harm. It is justified by the concept expressed by Clausewitz that war is waged solely to overcome the will of the enemy to resist. The inference is that there is no need for physical combat between belligerents. Who can tell? We, they reason, very likely will have the biggest and best missiles. Next, man can satisfy his greatest yearning for adventure by merely pushing a button, like a small boy starting a fire. The war is surely to be won if you push the right button. Fortunately, or unfortunately, depending upon your point of view, this school of thought is in the minority.

The majority of our civilian scientists and military leaders are of the opinion that missiles alone, backed by the most elaborate bank of push buttons, cannot win wars. Man must close with his adversary. He must exploit any advantage quickly and ruthlessly. Ultimately, he must occupy any temporary gains he may enjoy so as unquestionably to win the final decision.

Perhaps the most learned civilian authority on the use of scientific aids in the prosecution of war is Dr. Vannevar Bush, who headed the Office of Scientific Research and Development during World War II. In a recent article he is quoted as saying: "Push-button warfare be damned. This talk does a lot of harm. The trouble is that the American people get to thinking in terms of pushing the buttons, and lose sight of the fact that, if there were a war tomorrow, it would be the same tough slugging match that the last one was." Which quite adequately summarizes "push-button war."

Guided missiles may encroach upon the

roles of the heavy bomber. They show such promise. It does appear, however, that many missiles will be flown by bomber-type craft to the proximity of their targets, say several hundred miles, and there launched and guided by the mother ship. So the bomber role may be this; mothering the missiles. That is not as dull as it sounds, not if antiaircraft missiles of target-finding characteristics and several hundred miles range are developed. The "wild blue yonder" shows promise of being just as wild as it ever was. There will be little excuse for nostalgic ruminations of the good old days of Frankfurt and Schweinfurt. But the bombardiers will not see as much close personal combat as they have in the past. That self-satisfying job will be the lot of the troop carrier pilots, the boys who fly everything, anywhere.

The troop carrier pilots, and their associates in combat, the airborne troopers, will play the leading role in future aer-

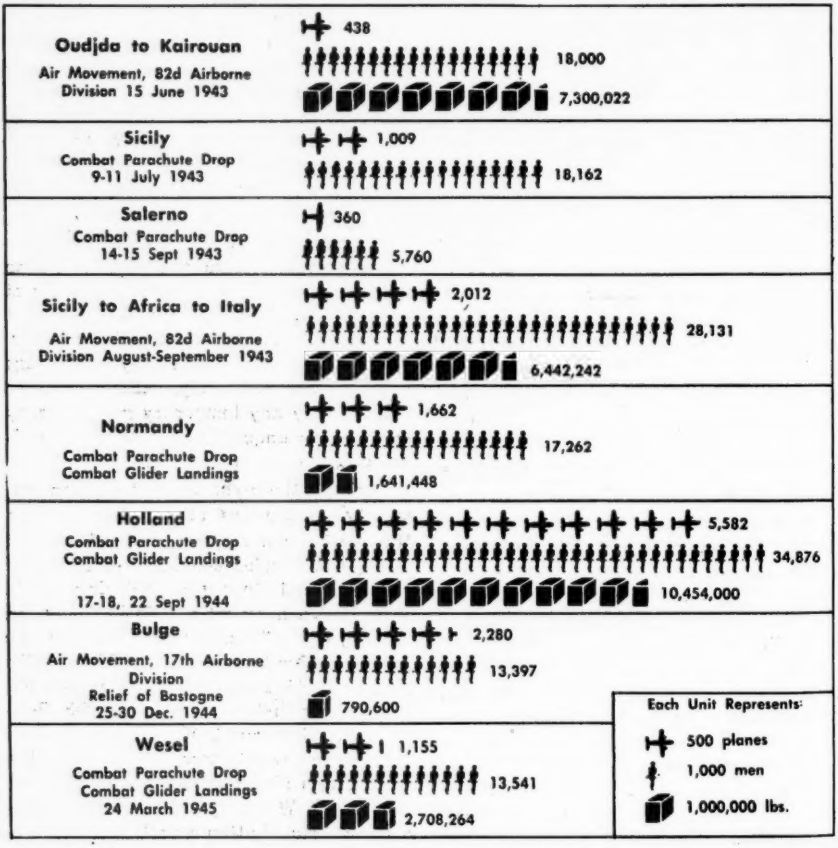
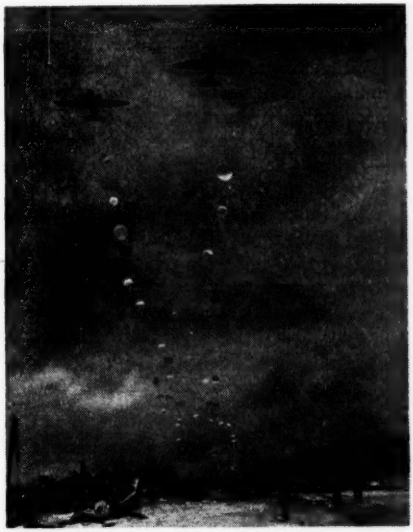


Table I.

ial combat. Together they provide the means of delivering a decisive blow anywhere within the capabilities of the aircraft they employ. And the aircraft that they employ will be the determinant of what they can accomplish. They must be provided with airplanes suitable for the work that they are expected to perform.

They did well with the C-47 in World War II. So well, in fact, that volumes could be written on the subject without doing it justice. The figures in Table I illustrate, as well as figures can, the growth and magnitude of the troop carrier airborne effort in the late war. They portray the troop carrier effort on the occasions its aircraft were concentrated to fly airborne missions. In addition, between airborne missions, many thousands of sorties were flown hauling supplies and evacuating wounded. Particularly impressive were the tonnages flown in the spring of 1945 (Table II).

It has been said on many occasions that the C-47 won the war. It may have. It was a remarkably fine air transport. But it and its combat companion, the CG-4 glider, fought under great handicaps. Neither was as well suited for combat roles as most of the seacraft were for theirs. Of course, man has been waging war on the seas for many, many centuries. Presumably the combat capabilities of aircraft will improve considerably in a like period of time.



Paratroops landing on Noemfoor Island. (Signal Corps photo.)

An amphibious operation begins at home. It begins in the factories, on the farms, and in the small towns. There the weapons, the men, and the wherewithal to fight are selected, prepared and started toward their goal, the beachhead.

They are transported, step by step, in vessels especially built for the task they perform. First, they move in large sea-

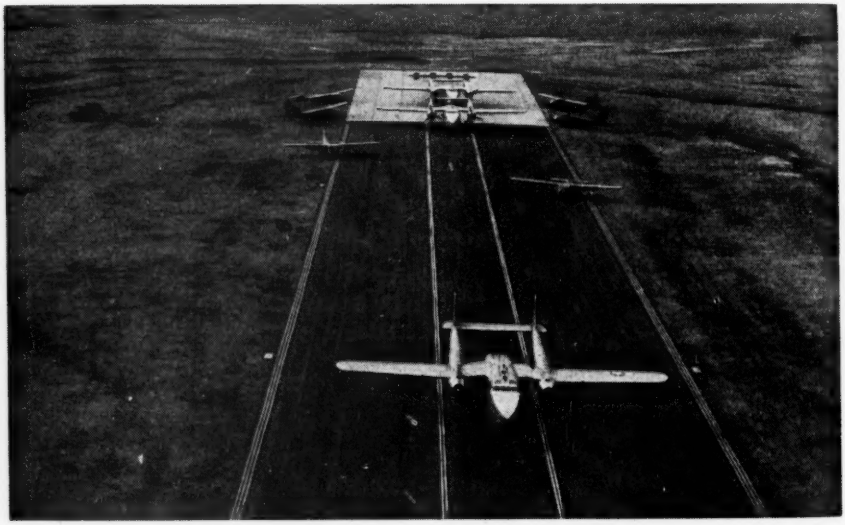
Period	Freight in Tons	Gas and Oil
1 January-31 March	16,306	727,667
April	59,496	10,255,509
1-10 May	11,108	1,949,036
	10,000 Tons	1,000,000 Gals.

Freight tonnage included the weight of gas and oil, which is listed in gallons. Dates are for 1945.

Table II.

going vessels of global, strategic types, such as the *George Washington*, the *Queen Mary* and the *Republic*. These ships carry a minimum of defensive armament, depending for protection on the static defenses of their harbors and the fighting abilities of their escorts. As they near the site of the beachhead, the combatants are parceled out, each to his own type craft. Some are large personnel carriers with especially constructed bows that permit the disgorging of hundreds of armed fighters on the beach in a few minutes. Others are shallow-draft tank carriers, mine sweepers, rocket launchers, and PT boats. Still others are freight carriers and DUKWs that travel on land and sea equally as well. Others have the sole task of carrying the engineer equipment to be used to prepare the way for larger vessels that will follow in the wake of the initial assault. Thus the beachhead is established.

Future war, with its predominant emphasis on airpower, will also begin at home. Because of the hazards of atomic attack, there will initially be thorough dispersion of our troops, industries, and resources. Through the use of strategic aircraft we should be able to mass the means of waging war quickly and effectively. We have many large air transports of the strategic, global type today. For example, the DC-6 and DC-7, the Constellation, the Boeing Stratocruiser. And month after month the range, speed and payload characteristics of our strategic aircraft are improving.



A C-82 takes off with two gliders in tow. (AAF photo.)

The pattern of the airborne attack will follow closely that of our highly developed amphibious attacks. The initial concentrations will be accomplished with strategic airplanes. As we come into the proximity of heavy enemy attack, men and weapons will be parceled out into especially constructed troop carrier combat aircraft.

From these they will make their final assault and establish an airhead. There should be as many types of aircraft as the conditions of future airborne combat require. Presumably the initial assault will be made by paratroops. It will until we develop better means of getting the first wave of assault airborne troops on the ground in the heart of unknown enemy country.

Following the paratroops will come the weapons and reconnaissance vehicles. Then will come the engineering equipment to open up airstrips. And from there on the build-up should continue until finally the growth and construction work of the airhead will permit the arrival of strategic craft. Just as the seizure of Cherbourg ended the purely beachhead phase of the Battle of Normandy, so the availability of airdromes suitable for large strategic air transports will end the battle of the airhead.

It is a mistake to think that the present means of waging airborne warfare are the best. Airplanes without pilot armor protection, self-sealing tanks, and protective armament have no place in the modern battle scene. To assume that the ordinary small commercial airplane can survive the spewing sea of flak that comes up from the modern battlefield is to assume that any ordinary small commercial boat could have been used to assault Utah and Omaha beaches. It required especially constructed craft, designed solely for that purpose. Future airborne combat will require the same things of aircraft.

We have excellent equipment today. The C-82 is an efficient, large payload, short take-off, airplane. It has an excellent combat potential. Its probable vulnerability to enemy fire, however, must be kept in mind. Our proposed all-metal, tail-opening, large-payload gliders will be the best in the world. But sooner or later we must get away from expending thousands of escort planes to protect the miles of nylon rope that it takes to tow them to combat. We have excellent equipment and, what is more important, we have more operational know-how and a greater aircraft production potential than any nation in the world.

We must exploit this potential. We need new ideas and we need new equipment if our national defense is to keep pace with the great developments of power and speed in modern airpower.

Paratroopers in action—Fort Bragg, N.C. (Fairchild Aircraft photo.)

Airborne weapons and vehicles must be improved by the use of lighter metals. They must be made more compact. Accurate short-range rockets as well as long-range rockets must be developed. But more important than any of these is the development of new types of aircraft: aircraft designed to absorb the punishment of the coming battles for airheads; aircraft that will permit the handling of cargo by merely hitching the fuselage to a prime mover and moving it off to dispersal areas

leaving the power plant, wings and flight control surfaces to remain for another load, aircraft that are especially designed for the assault roles they must fill in the initial stages of an airborne-troop carrier attack.

American industry has met every requirement of our armed forces in the past. That it will in the future there is no doubt. When it does we may feel sure that our way of life and all that it means to the world will be secure. For as our forefathers have "marched to the sound of guns" before us, so must we if the need ever arises. We must not be forced to seek security in passivity. We must have proper weapons and, in fact, every component of airpower. We must, if we intend "to git thar fustest with the mostest" as the renowned Confederate cavalry general, Nathan Bedford Forrest, put it. That is what it will take to win.

In the near future, we will be able to fly a standard infantry division, with all of its armament to battle. Our infantry battalions, with their artillery are already airtransportable. When present Ordnance and Air Force developments culminate in a heavy airportable tank, we can fly standard infantry regiments to the attack. When Engineer and Air Force developments produce heavy engineer equipment which is airportable, we can fly a standard infantry division to war.

* * *

When we have an Army which can fly to fight, and an Air Force that can fly it, there is every prospect that we can avoid war, and make the peace permanent. The guarantee of sure, swift retribution will certainly deter any would-be aggressor.

General Jacob L. Devers

The vulnerability of the economic structure of the United States to attack from the air makes our future security dependent upon the rapidity with which spearheads can be established to launch an air offensive against enemy sources of air power, and to deny such an enemy the use of air bases from which he can operate effectively against the United States. The combat forces required to seize these advanced bases and to bring an air offensive to bear on the enemy in an emergency are provided in the Armed Forces. The ability of these combat forces to act quickly, however, is measured by the speed with which they can be established and maintained in advanced locations. This deployment and support is the job of the Air Transport Command.

Major General Robert M. Webster

Career Guidance
— *A New Army Function*

Colonel C. W. Van Way, Jr., *Infantry*
Instructor, Command and General Staff College

ABOUT seventy per cent of the commissioned officers who served in the Army of the United States during World War II started their military service in the enlisted ranks. More than half a million enlisted men and women were commissioned as officers after attending Officer Candidate and Aviation Cadet Schools; over fifty thousand were commissioned directly from the ranks and nearly ninety thousand were made warrant and flight officers from enlisted grades. All of these were vastly exceeded of course, by the many thousands of technicians and noncommissioned officers who were required by our wartime Army of eight million men and women. These were secured by training and promoting the necessary numbers from the ranks of those inducted to fill our personnel needs.

This healthy condition of advancement from within attracts high caliber personnel to the ranks. It serves as a constant incentive to individual effort and makes a major contribution to the support of good morale.

In the planning for our new and smaller peacetime Army, the importance of this system of selective training and promotion, with its encouragement to individual initiative, received early recognition. This has resulted in the formulation of the plan for career guidance for enlisted men and warrant officers which is the subject of this article.

The plan is to be placed in effect on 1 March 1948. It is described in detail by War Department Circular 118 of 9 May 1947, which has the title of "Career Guidance Plan for Warrant Officers and Enlisted Personnel." It is also the subject of Army Talk 178, 31 May 1947, with the title, "What Is Your Ceiling?" These informative publications have been supplemented by discussions between the Personnel Director of the War Department and Personnel Officers of the major commands, and by material presented to students at various schools. Comments and recommendations from all personnel have been urgently requested. Complete understanding and general acceptance of the plan by all individuals concerned will greatly contribute to its success.

The plan, to quote from W.D. Circular 118, "is a broad program designed to build a broadly qualified well-rounded noncommissioned and warrant officer corps which in time of emergency will provide a trained cadre for mobilization and will augment the Regular Army officers' corps." Its principal elements are:

(a) A determination of what jobs are necessary for the Army to accomplish its mission, together with the proper standards and grades for each job.

(b) A training program for qualified personnel to fill each job.

(c) A system of personnel procedures for getting the right man to the right place at the right time.

The War Department Survey and Analysis of all the Army's jobs, which was conducted throughout the war period, has been intensified and slanted directly at the career guidance program. It is seeking specific answers to the questions: What jobs are essential to the peacetime military organization? Into what natural groupings do they fall? How do they compare in difficulty, responsibility, technical knowledge and physical fitness required? What jobs are found in only one arm or service? What jobs are just about the same no matter what the arm or service? What should be the relative pay and grade of a soldier doing each job under varying conditions? What changes in Military Occupational Specialty numbers should be made to correspond with the revised job setup? What experience and training are required for the many jobs? How can jobs be organized to ensure that an individual will be assured advancement in pay, responsibility and authority as he gains experience and skill? How can we determine how much knowledge or skill an individual actually has?

This analysis will be used to establish a job-and-grade structure designed to ensure for every army job:

(a) A specific description and Military Occupational Specialty number.

(b) Specific requirements in training knowledge and skill.

(c) A specific test, or set of tests, to determine whether the soldier has the required knowledge and skill.

(d) A grade—corporal, sergeant, warrant officer and so on—so established that equal skills receive equal pay regardless of arm, service or branch.

In making a complete analysis of the job structure as a whole it is necessary to accomplish the following:

(a) A determination of the mission of the Army.

(b) A determination as to what jobs are needed in the Army in order that the mission may be accomplished.

(c) The grouping of jobs into definite job fields in terms of like occupational requirements (skills, techniques, abilities, and experiences).

(d) A designation by the War Department of one agency to have primary interest in each such job field.

(e) The arranging of progression ladders in each job field showing the possibilities for development and promotion to the highest position in each such ladder as well as for lateral transfer to related job ladders.

Military Occupational Specialties are being redefined and recoded. This is designated to eliminate superfluous MOSs, consolidate existing ones and establish new ones where appropriate. Close attention is paid to the importance of providing a job code structure readily adjustable from peacetime operation to the needs of wartime expansion.

When the plan is placed in effect, based upon the survey and analysis just described, it is hoped that there will have been established a system which will provide an over-all pattern of job fields offering wide opportunities to career soldiers for all-around development within a field, but providing within such broad field the opportunity for narrower specialization when necessary for mobilization or for civilian components.

Important steps in the implementation of this plan are the initial and continuing tests and ratings for the determination of individual ability and aptitudes. The following tests, of which (a), (b), and (c) below, are normally being used in replacement training centers, will be given:

(a) *Army General Classification Test* to determine the general learning ability of the individual.

(b) *General Education Development Tests* (now available through United States Armed Forces Institute for high

school and college levels) for determining the educational level of the individual.

(c) *Aptitude Tests* for determining the aptitude of an individual for learning particular skills.

(d) *Technical Proficiency Tests* to determine whether the individual has mastered the technical knowledge or skill necessary for the job. These standardized tests will be administered for all personnel entering fifth through first grades and for warrant officers. These tests are now being constructed by the War Department in conjunction with the major commands and administrative and technical services and will be made available to unit commanders when required.

(e) *General Military Subjects Test.* In the Army, each man is a soldier first, a specialist second. Accordingly, all persons progressing from the seventh to the sixth grade will be required to take an examination designed to test their knowledge and proficiency as a soldier. This test is now being developed by the War Department and will be made available to unit commanders.

(f) *Officer's Candidate School Test.* See W.D. Circular 101, 1947.

(g) *Test for a commission in Officers' Reserve Corps.* Personnel entering the third grade of NCO rank will be offered the opportunity of taking a test to determine their qualifications for a commission in the Officers' Reserve Corps. Those meeting the prescribed standards and indicating their desire, will be given Reserve commissions without the necessity of attending officers' candidate schools. Qualified personnel with Reserve commissions will be given an opportunity to receive extended active duty training in their commissioned grade, at which time they may compete for commission in the Regular Army Officers' Corps.

Warrant officers and enlisted personnel will be rated on their conduct and manner of performance of duty. Warrant officers will be rated on the same type of efficiency report as used for commissioned officers. The War Department is at present developing a rating scale for enlisted personnel. Studies will determine type of rating, frequency of rating and administrative handling. Consideration will be given to rating, scoring, filing and control, to include possibility of maintenance of efficiency reports at the level that administrative action is to be taken. This includes the possible use of throwaway material for one or more of the lower grades and entry of a standard score on appropriate records. The accomplishment of scoring and interpretation in the field will be considered essential.

In order to insure that present noncommissioned officers possess the desired ability on their jobs, most of them in the first three grades will be required to take appropriate MOS tests six months after it is officially announced that all promotions will be based on MOS tests. First three-graders with ten years service, three of which have been in their present, or higher grades, will not be required to take the tests.

Those who fail to pass will be reduced to the next lower grade. After six months in the lower grade they will be required to take the tests for that lower grade or be further reduced. No man may be reduced more than one grade at a time, however, except by action of court-martial. All personnel who fall below certain efficiency standards for a stated period will be brought before a board to be considered for reduction.

The surveys made for the purpose of putting the guidance program in operation will indicate what educational requirements will be established for each job field and for each step in the progress up the "job ladders." Since these requirements will obviously necessitate

periods of schooling, longer enlistments will be the rule. Normal enlistments will be for periods of two, three, four, five or six years with reenlistment offered for periods of three, four, five or six years. Upon promotion to the third grade, or as will be shown later, to sergeant first class, a soldier will be discharged and will reenlist for an indefinite period. Under such an enlistment, he may either serve until retirement or resign before retirement, and under normal conditions, may expect to have his resignation accepted within three months after it is submitted. Thus the length of his army service, like that of a commissioned officer, is in his own hands.

The schooling and training which will be specified in the criteria for the various grades in each Military Occupational Specialty, will include the normal replacement training now current, with improvements, however, in selection procedures. Following this will be a period of apprentice or on-the-job training. This will be more standardized in order to meet the specific requirements set up for job progress.

The excellent school system within the Army will become increasingly important. To enable personnel to progress to MOS for which formal school training is prerequisite, zone of interior army commanders will maintain school priority lists for personnel who meet the required criteria for the MOS and grade. Quotas allocated by the War Department to such commanders will reflect the number of eligibles in each command. To accomplish this, army commanders will require unit commanders to submit information as to number of personnel nominated to attend schools for whom school training for further promotion is required. This report will include competitive standing on whatever criteria is applicable to the MOS and grade. A consolidation of these reports at army level will establish, according to the criteria, the order of selection. At the same time these consolidations, when reported to the War Department, afford opportunity to allocate quotas upon a basis of need. Army commanders will not sub-allocate quotas but will designate men from their lists.

Commanders will use troop information and education officers for the purpose of informing personnel where numerous courses now taught by United States Armed Forces Institute can be used in the self-preparation for many of the specialist MOS examinations. The job descriptions of the MOS and the course description of USAFI catalog should be used by personnel classification officers and education officers alike to convey to personnel the advantages derived from this study. The functions of training, personnel management, and information and education all merge in this field.

Personnel receiving reserve commissions will be given adequate opportunity for extended active duty training. Such training will count on any required time in grade for promotion in the enlisted grades and relative standing on eligibility promotion lists will be protected during absences for such training period.

The present seven grade structure for enlisted personnel will be retained, with some changes in titles as shown below:

(a) First grade—master sergeant (first sergeant and sergeant-major are retained as occupation titles).

(b) Second grade—senior sergeant (platoon sergeant is retained as an occupation title).

(c) Third grade—sergeant, first class.

(d) Fourth grade—sergeant.

(e) Fifth grade—corporal.

(f) Sixth grade—private, first class.

(g) Seventh grade—private.

All technicians' ratings and chevrons will be abolished. Technicians will be in-

tegrated into the appropriate pay grade with title as given above.

Chevrons will be as shown in Figure 1. Appropriate markings on the blue background will indicate the job field of the wearer. Combat commanders of noncommissioned officer grades will wear a distinctive insignia consisting of a forest green strip of cloth around each shoulder loop (fastened to shoulder where there is no shoulder loop) of all outer garments.

The plan is very specific about requirements for promotion up the NCO ladder and about who makes them.

Promotion from *private* to *private first class* will be made by company or similar unit commanders when a soldier has completed basic training satisfactorily and has passed the General Military Subjects Test. Promotion to Pfc. will not require a "vacancy." A bill now before Congress makes it automatic after four months of satisfactory service (instead of six), provided basic training has been completed.

Promotion to corporal may be made by regimental, separate battalion, or similar unit commanders after the soldier has six months of satisfactory service, has passed the appropriate grade and MOS tests, and provided a vacancy exists. After twelve months' service the promotion will be made even if no vacancy exists. In other words, regardless of vacancies, a qualified man will become a corporal after a year of service. All promotions above corporal will be made to fill vacancies.

A corporal will be eligible for promotion to *sergeant* after six months of satisfactory service as corporal, and after passing grade and MOS tests. Promotion to sergeant will be made by regimental, separate battalion, or similar unit commanders.

A sergeant will be eligible for promotion to *sergeant first class* after twelve months of satisfactory service as a sergeant and the required tests. Promotion to sergeant first class will normally be made by regimental, separate battalion, or similar unit commanders, but a higher commander may centralize promotions of sergeants first class in order to equalize opportunity throughout his command.

Promotion to *senior sergeant* will be centralized in the headquarters of numbered armies, oversea theaters, and technical and administrative services (Signal Corps, Chemical Corps, Ordnance Department, etc.). Examinations will be conducted from these headquarters.

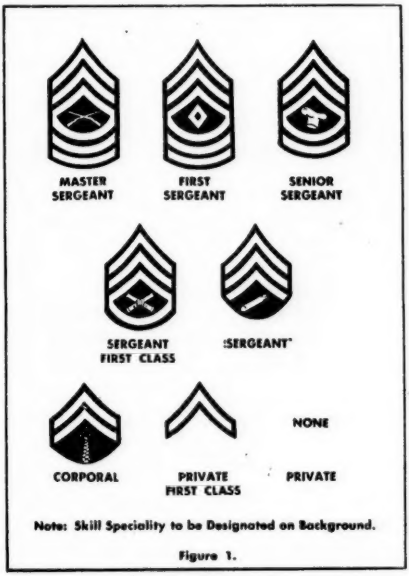


Figure 1.

To be eligible for such a promotion, three years of total active service, including twelve months as sergeant first class and passing appropriate grade and MOS tests will be required.

If a man who has passed the tests transfers from one army to another, his score will go with him.

Promotion to *master sergeant* will be made by the War Department, to fill world-wide vacancies. For this promotion five years' total active service, including

eighteen months as senior sergeant, will be required. A world-wide competitive examination will be held at stated times at regimental level. The examinations will be graded by the War Department and the names of candidates who qualify will be placed on a War Department eligibility list, in the order of scores.

Time-in-grade requirements will not have to be met by former officers and warrant officers; nor will they have to be met by former noncommissioned officers for promotion up to their highest former enlisted grade. For example, a soldier who has already served honorably as sergeant and was not reduced for inefficiency or disciplinary cause will not have to serve six months as a corporal in order to make sergeant again. But he will have to pass the grade and MOS tests required for sergeancy.

Here is the way the enlisted set-up will look under the new system as compared with the way it was in the Regular Army on 31 January 1947:

Grade	*31 January*	*Future*
Master Sergeant	4.8%	4.3%
Senior Sergeant or equivalent	3.7	5.3
Sergeant first class or equivalent	6.9	14.3
Sergeant	8.9	22.5
Corporal	15.5	23.8
Pfc. and Private	60.2	29.8
	100.0%	100.0%

The decrease in the percentage of master sergeants will be made up by the greatly increased number of warrant officers.

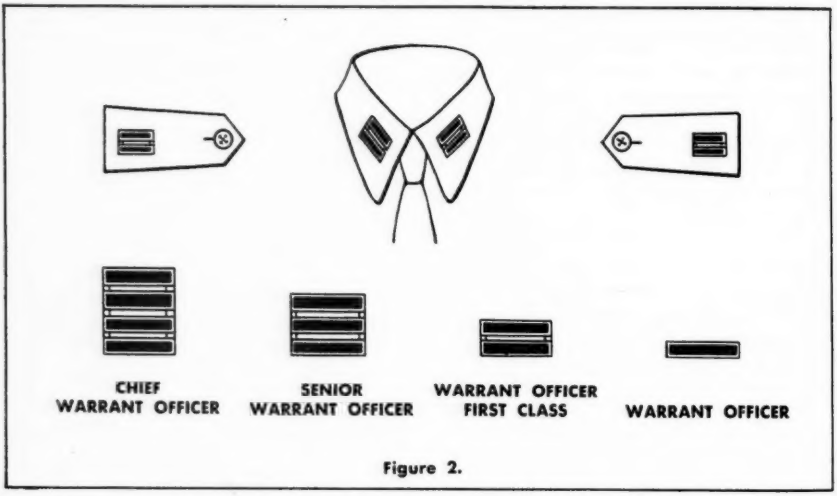


Figure 2.

Present plans are that original appointments as warrant officers will be made from enlisted men who have six years of active duty and are between the ages of twenty-three and thirty-five, and the promotions to the three higher warrant officer grades will require five, six and seven years' service-in-grade and eleven, seventeen and twenty-four of total active service, respectively, as well as passing appropriate MOS and grade tests.

It is planned to abolish the grade of "warrant officer, junior grade" and to increase the number of warrant officer grades from two to four. Legislative ac-

tion is being sought to authorize four grades of warrant officers in the Army as follows:

(a) Chief warrant officer, with pay and allowances of an officer of the fourth pay period.

(b) Senior warrant officer, with pay and allowances of the third pay period.

(c) Warrant officer, first class, with pay and allowances of the second pay period.

officer grades. This program will in effect lift the ceiling for enlisted personnel and permit them to advance to grades receiving the pay of officers in the fourth pay period. Retirement of warrant officers will be compulsory upon completion of thirty years' total active military service.

As an example of how the career guidance plan will work in one important field, Figure 3 shows the chart of the Army Food

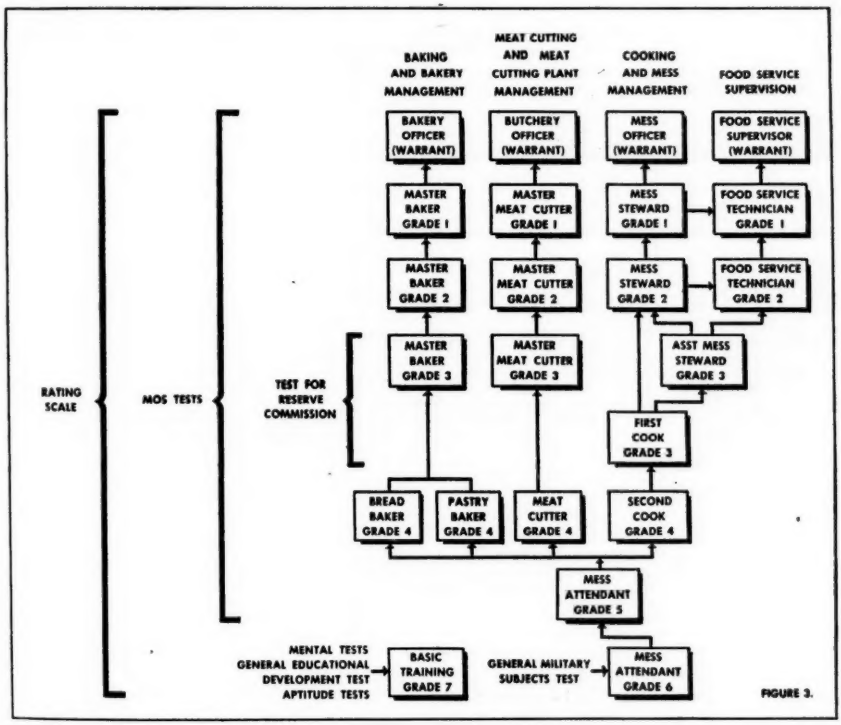


FIGURE 3.

(d) Warrant officer, with pay and allowances of an officer of the first pay period.

For insignia of grade see Figure 2.

Suitable warrant officers jobs will be established to permit advancement throughout all enlisted job fields into warrant

Service job field, in which much reorganization has already been made.

The service is subdivided into (1) Baking and Bakery Management, (2) Meat-Cutting and Meat-Cutting Plant Management, (3) Cooking and Mess Management, and (4) Food Service Supervision. In

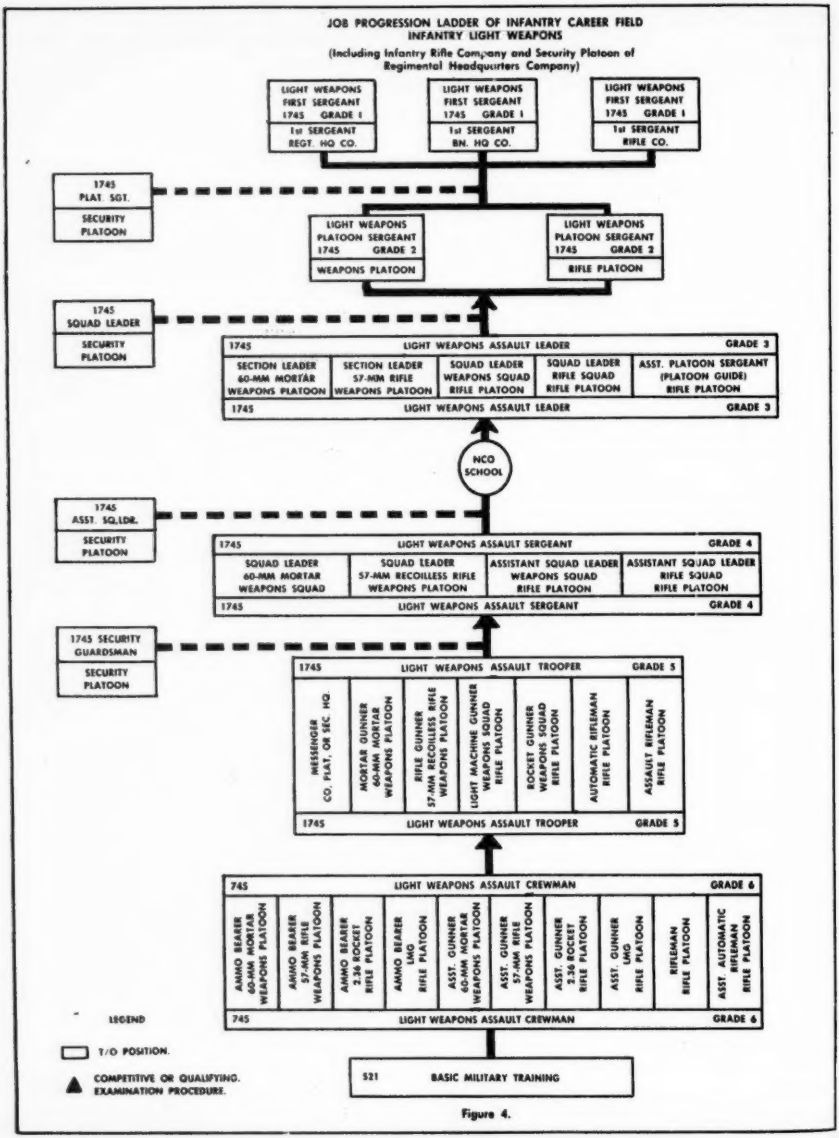

JOB PROGRESSION LADDER OF INFANTRY CAREER FIELD
INFANTRY LIGHT WEAPONS
(Including Infantry Rifle Company and Security Platoon of Regimental Headquarters Company)
LIGHT WEAPONS FIRST SERGEANT 1745 GRADE 1
1st SERGEANT REGT. HQ CO.
LIGHT WEAPONS FIRST SERGEANT 1745 GRADE 1
1st SERGEANT BN. HQ CO.
LIGHT WEAPONS FIRST SERGEANT 1745 GRADE 1
1st SERGEANT RIFLE CO.
1745 PLAT. SGT.
SECURITY PLATOON
LIGHT WEAPONS PLATOON SERGEANT 1745 GRADE 2
WEAPONS PLATOON
LIGHT WEAPONS PLATOON SERGEANT 1745 GRADE 2
RIFLE PLATOON
1745 SQUAD LEADER
SECURITY PLATOON
1745 LIGHT WEAPONS ASSAULT LEADER GRADE 3
SECTION LEADER 60-MM MORTAR WEAPONS PLATOON
SECTION LEADER 57-MM RIFLE WEAPONS PLATOON
SQUAD LEADER WEAPONS SQUAD RIFLE PLATOON
SQUAD LEADER RIFLE SQUAD RIFLE PLATOON
ASST. PLATOON SERGEANT (PLATOON GUIDE) RIFLE PLATOON
1745 LIGHT WEAPONS ASSAULT LEADER GRADE 3
NCO SCHOOL
1745 ASST. SQ. LDR.
SECURITY PLATOON
1745 LIGHT WEAPONS ASSAULT SERGEANT GRADE 4
SQUAD LEADER 60-MM MORTAR WEAPONS SQUAD
SQUAD LEADER 57-MM RECOILLESS RIFLE WEAPONS PLATOON
ASSISTANT SQUAD LEADER WEAPONS SQUAD RIFLE PLATOON
ASSISTANT SQUAD LEADER RIFLE SQUAD RIFLE PLATOON
1745 LIGHT WEAPONS ASSAULT SERGEANT GRADE 4
1745 SECURITY GUARDSMAN
SECURITY PLATOON
1745 LIGHT WEAPONS ASSAULT TROOPER GRADE 5
MESSENGER CO. PLAT., OR SEC. HQ.
MORTAR GUNNER 60-MM MORTAR WEAPONS PLATOON
RIFLE GUNNER 57-MM RECOILLESS RIFLE WEAPONS PLATOON
LIGHT MACHINE GUNNER WEAPONS SQUAD RIFLE PLATOON
ROCKET GUNNER WEAPONS SQUAD RIFLE PLATOON
AUTOMATIC RIFLEMAN RIFLE PLATOON
ASSAULT RIFLEMAN RIFLE PLATOON
1745 LIGHT WEAPONS ASSAULT TROOPER GRADE 5
745 LIGHT WEAPONS ASSAULT CREWMAN GRADE 6
AMMO BEARER 60-MM MORTAR WEAPONS PLATOON
AMMO BEARER 57-MM RIFLE WEAPONS PLATOON
AMMO BEARER 2.36 ROCKET RIFLE PLATOON
AMMO BEARER LMG RIFLE PLATOON
ASST. GUNNER 60-MM MORTAR WEAPONS PLATOON
ASST. GUNNER 57-MM RIFLE WEAPONS PLATOON
ASST. GUNNER 2.36 ROCKET RIFLE PLATOON
ASST. GUNNER LMG RIFLE PLATOON
RIFLEMAN RIFLE PLATOON
ASST. AUTOMATIC RIFLEMAN RIFLE PLATOON
745 LIGHT WEAPONS ASSAULT CREWMAN GRADE 6
LEGEND
T/O POSITION.
COMPETITIVE OR QUALIFYING. EXAMINATION PROCEDURE.
521 BASIC MILITARY TRAINING

Figure 4.

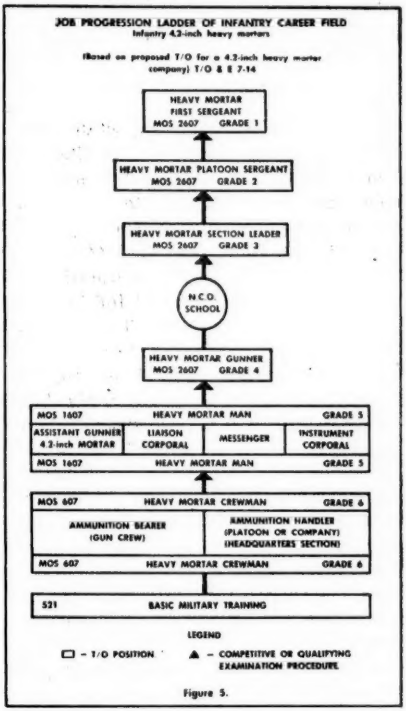
this service a recruit who has completed basic training as a private serves first as a mess attendant, in the grade of Pfc., and may then rise through the several job levels and NCO grades, in any one of the four subdivisions of the field, to the supervisory jobs that carry warrant officer grades. As we have seen, he may also qualify, on the way up, for a commission.

For training above the apprentice level, qualified men and women will attend one of the Quartermaster Corps food service schools located in each Army Area, the Quartermaster School at Camp Lee, Virginia, or the Armed Forces Food and Container Institute, Chicago, Ill.

Further examples of job fields are shown in Figures 4 and 5, which show how an individual may progress through different job levels and corresponding grades from basic military training to the first grade, in two fields within the Infantry. The training which is shown between each major level is given first in the replacement system, then in the units and finally in the Infantry School at Ft. Benning. Practical experience will be gained in units, particularly during field maneuvers.

As has been stated before, this plan will require the understanding and support of all concerned in order to be a complete success. Commanding officers will have a vital role to play in all phases of the program. With the assistance of their Personnel Management Technicians, their Troop Information and Education and their Training Staffs, they will have the responsibility of the counseling and guidance for enlisted men's careers.

Since the present publications concerning the career guidance plan are tentative, and because comment and recommendations from the field have been invited by the War Department, it is probable that changes in some of the details of the plan, will be made. Certain features require action by Congress, which may result in changes on some points. It undoubtedly will, however, retain its object, which, in


JOB PROGRESSION LADDER OF INFANTRY CAREER FIELD
Infantry 4.2-inch heavy mortars
(Based on proposed T/O for a 4.2-inch heavy mortar company) T/O & E 7-14
HEAVY MORTAR FIRST SERGEANT MOS 2607 GRADE 1
HEAVY MORTAR PLATOON SERGEANT MOS 2607 GRADE 2
HEAVY MORTAR SECTION LEADER MOS 2607 GRADE 3
N.C.O. SCHOOL
HEAVY MORTAR GUNNER MOS 2607 GRADE 4
MOS 1607 HEAVY MORTAR MAN GRADE 5
ASSISTANT GUNNER 4.2-inch MORTAR
LIAISON CORPORAL
MESSENGER
INSTRUMENT CORPORAL
MOS 1607 HEAVY MORTAR MAN GRADE 5
MOS 607 HEAVY MORTAR CREWMAN GRADE 6
AMMUNITION BEARER (GUN CREW)
AMMUNITION HANDLER (PLATOON OR COMPANY) (HEADQUARTERS SECTION)
MOS 607 HEAVY MORTAR CREWMAN GRADE 6
521 BASIC MILITARY TRAINING
LEGEND
□ – T/O POSITION
▲ – COMPETITIVE OR QUALIFYING EXAMINATION PROCEDURE
Figure 5.

the words of the Director of Personnel and Administration, War Department General Staff, is "to widen the horizon of the enlisted man, to give him more stability and greater opportunity, and to let him know when he comes into the army what his opportunities are."

A 'Shoestring' Operation

Colonel William Whipple, *Corps of Engineers*

THE SHEAF Planning Staff had a difficult morning. The Planning Staff had been assembled to arrive at the most feasible operation to liquidate pockets of German resistance still remaining in the Biscay ports in the fall of 1944. Brigadier Kenneth McLean, who presided in his capacity as "Head Planner" for G-3, outlined the problem briefly. The coastline concerned was thoroughly familiar to a number of planners present, having been exhaustively studied during early COSSAC planning for the invasion. There was forty miles of perfect beach, but the weather was treacherous and anchorages exposed; moreover, the area was vulnerable to submarines and long distance bombing, and too far from our bases for effective air support. Air and naval planners nodded assent. The port of Bordeaux was far up the estuary, coast defenses were still held by the Germans in some strength; mines were at least probable, and a frontal attack by naval forces had been rejected by naval planners. However, adjacent beaches were undefended and several plans had been worked out for landing, outflanking, and clearing out the various German pockets. Alternately, a land force could be moved from either north or east over largely undefended country. It was estimated that in any case the land operations should be undertaken by a corps of three divisions. Major problems remaining to be solved included:

(a) What staff would plan the operation and who would command it?

(b) What divisions would be used and where would the operation be mounted and/or supported from?

(c) Were supply resources and administrative troops available to support the operation?

At this point, Brigadier McLean dropped the problem in the hands of other planners present for general discussion.

The general strategical situation of ground forces at the date of this meeting was approximately as shown on the map. The main U.S. and British Armies which had landed in Normandy were still being supplied by ports on and south of the Seine; Twelfth Army Group was fighting through eastern France and Luxembourg; and operations were largely restricted by the limitations of the long lines of supply, principally by rail through Paris. The area as far south as the Loire valley was generally in our hands, but the ports of the Britany Peninsula were mostly unusable due to prolonged resistance with consequent port and rail demolitions.

Sixth Army Group had made very rapid progress up the Rhone valley, and had come abreast of Third Army, and it seemed likely that Seventh Army and First French Army on the south flank would close on the Rhine River within a month or two, despite the difficulties of relatively low logistical priorities and the snow of the Vosges Mountains. The early liberation of

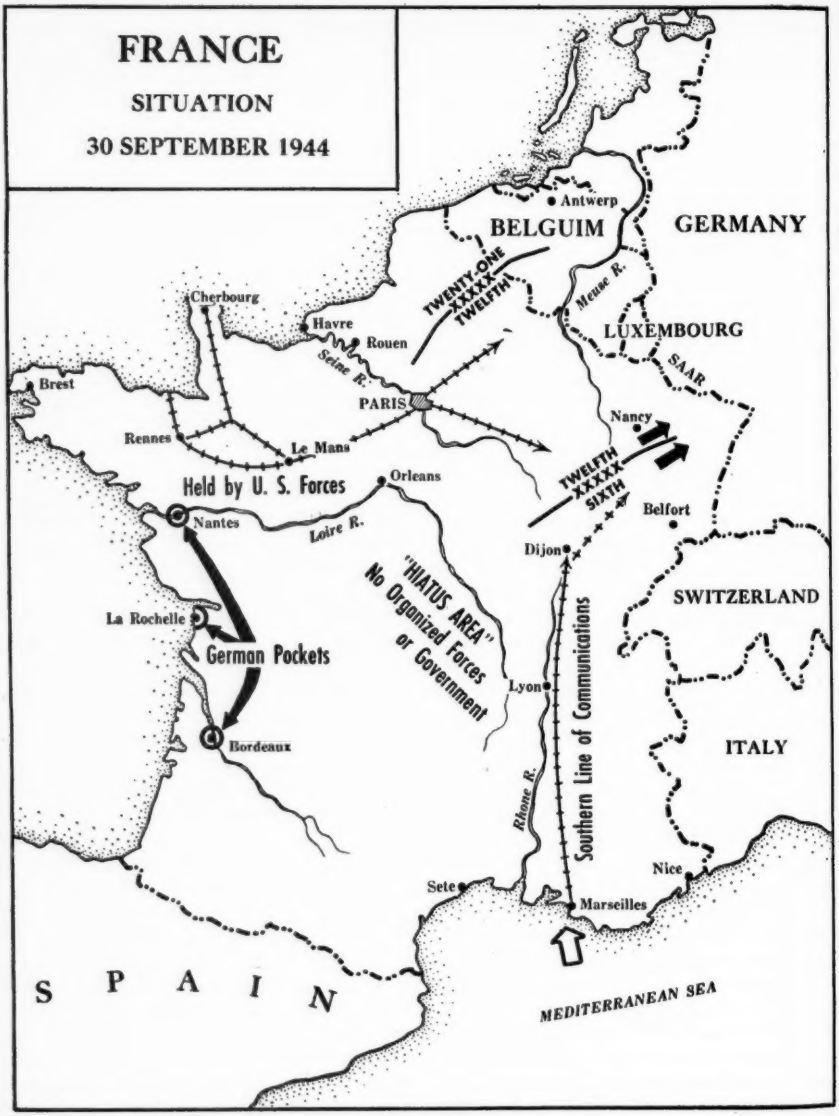
most of northern, central, and eastern France seemed assured, by the normal course of operations already planned.

On the other hand, all of southwest France, including the area south of the Loire and west of the Rhone valley, was a military no man's land, the so-called "hiatus area," which had been completely by-passed by the main operations.

General discussions followed on various possible plans, all of which are open to numerous objections. The most economical and most feasible plan seemed to be to send troops overland, under the command of one of the U.S. Army Groups, and based on existing ports and lines of communication. However (said G-4), this would require major bridge construction, establishment of a new rail line for supply, and diversion of truck companies to handle (say) 2,000 tons a day forward of railhead depending upon the conditions encountered, particularly as regards use of artillery. The diversion of these logistical resources at a time when a shortage of these particular items was preventing the deployment of all U.S. divisions in battle, would further aggravate a difficult general situation. G-3 then asked whether the amphibious operation to clear the pockets would be administratively acceptable. The answer had to be given that it would not be—that with the critical shortage of port capacity, the closing down of beaches due to the equinoctial gales, and the congestion of loaded shipping at the ports, the provision of port companies to open a new port, even for only 2,000 tons a day, seemed quite unfeasible. Moreover, the truck companies would still be required for such an operation; and they were probably the most critical unit on the troop list that month, particularly in the south.

G-3 then outlined more particularly the conditions which called for the early reduction of these pockets of Germans. The junction of Sixth and Twelfth Army Groups had left the entire area of southwest France without any effective governing machinery. The German occupation regime had collapsed, but there were neither U.S. nor French forces to maintain order; and there were in the area, besides the known pockets of resistance, large numbers of scattered German troops, bands of FFI, released prisoners of French and other nationalities, refugees and foreign labor groups and, allegedly, bands of infiltrees from across the Spanish frontier. Information from within the area was scarce and conflicting, and some of it apparently selfishly inspired, but the net impression created was disturbing. There were reports of disorder and lawlessness, sporadic engagements between armed bodies, and foraging and looting by German elements. It would be most desirable from both the humanitarian and political considerations to enter the area, eliminate German activity, and protect private life and property as soon as possible.

G-4 was then asked whether it was still considered definitely impossible to support this small operation, in view of the critical and touchy political considerations involved in further delay. The three divisions could be taken from those staging on the continent and not yet in combat. The G-4 answer was that the operation could be undertaken only provided G-3 was willing to obtain for it priority over the main operations to defeat the German Army, since all logistical resources were committed to support the main operations, and were already overextended. The employment of the staging divisions could only be supported by withdrawing resources being used for support of other divisions already in combat and, in effect, of immobilizing those divisions. G-3, only too well aware of what either Army Group Commander would say regarding such a proposal, unhappily agreed that that was not feasible. The Planning Staff then disbanded with no result except a


FRANCE
SITUATION
30 SEPTEMBER 1944
Antwerp
BELGUIM
GERMANY
TWENTY-ONE
XXXXX
TWELFTH
Meuse R.
Cherbourg
Havre
Rouen
Seine R.
LUXEMBOURG
SAAR
Brest
PARIS
Nancy
Rennes
Le Mans
Held by U. S. Forces
Orleans
TWELFTH
XXXXX
SIXTH
Belfort
Nantes
Loire R.
Dijon
"HIATUS AREA"
No Organized Forces
or Government
SWITZERLAND
La Rochelle
German Pockets
Lyon
Southern Line of Communications
ITALY
Bordeaux
Rhone R.
Nice
Sete
Marseilles
S P A I N
MEDITERRANEAN SEA

not-very-hopeful agreement to study the matter further.

For some time thereafter the "hiatus area" remained an unsolved problem. Finally one day a young British officer in G-3 suggested to logistical planners the use of certain irregular French colonial troops who, being lightly armed, mounted on horses, and not organized and equipped on U.S. lines as most of the First French Army was, were not much wanted for the main operations. Several regiments of such troops were available in Africa, mostly Zouaves and Spahis. Admittedly such a force was all but worthless to dislodge well armed German forces in the pockets, but on the other hand, by operating between Marseilles and Bordeaux they might be able to restore law and order in the greater part of the "hiatus area" and along the Spanish frontier.

This suggestion immediately appealed to the logistical planners for several reasons. These troops were largely horse-mounted and so were without the vehicles and heavy weapons which require a modern force to be followed by tons of gasoline and ammunition. (Napoleon is alleged to have said that an Army marches on its stomach; but in terms of tonnage it would be much more appropriate to say that a modern army swims on a tidal wave of gasoline.) Moreover, being of French nationality and not great in number, these troops could rely in emergencies on local food supplies, forage for animals, billets and hospitalization, to a much greater extent than could an American corps, and could do so without political repercussions. About 200 tons of supplies a day from the rear would be adequate to support the operation under these conditions. This quantity of supplies could be handled by one small coaster a day from Marseilles to the port of Sete, which had a cleared channel deep enough for such coasters, and civilian labor enough to handle unloading. A French base supply unit was found in Africa to help out. From Sete, through singular good fortune, an electric railway line (requiring no coal) was found to be still occasionally operating to Bordeaux itself. Operation of this railway line by French civilians would not retard in any way the critically important railway operations elsewhere, since the rolling stock could not be diverted, due to blown bridges, and since no coal was required. In short, this particular force of French light colonial troops could undertake this operation with practically no diversion of logistical resources, whereas the normal type operation would have required a diversion of effort which was, under the circumstances, prohibitive.

The following unorthodox "shoestring" operation was initially regarded as a poor and shoddy device in a staff where operations were measured in tens of divisions and thousands of tons of supplies per day. It introduced non-standard troops, weak in numbers, operating in remote areas against an enemy whom they could never completely and decisively defeat. It complicated command and administrative arrangements in several directions to a degree which seemed out of all proportion to the size of the force. To Supreme Headquarters, accustomed to dealing in terms of Army Groups and Air Forces, this plan appeared a sort of a "bargain basement remnant of the fabric of war." However, the situation in southwest France was fraught with all sorts of dangers of a political and social nature, highly alarming to practical soldiers who wanted to get on with the war. Some form of action there was imperative, and when the costs of alternate plans were considered, the shoestring plan looked very sound indeed. The logic was inescapable and the plan was approved. It was designated Operation Independence.

There was some hesitation about issuing a directive on this operation to Sixth Army Group. General Devers and his staff

were absorbed in the main battle for the Rhine Valley and the invasion of Germany, and could not be expected to have a very live interest in the "hiatus area" difficulty or in the rather curious little operation which, due to logistical limitations required that these measures be adopted for its relief. Therefore, three staff officers were sent down to "sell" the logic of the idea to Sixth Army Group, which proved not to be as difficult as anticipated, as the economy of the plan had a strong appeal at that time. Afterwards the formal directive was issued, a French Commander was appointed by Sixth Army Group, and the operation carried out successfully. The area was brought under control, and resistance to French military authority was quickly confined to the few pockets of Germans still holding out at the ports. The city of Bordeaux itself was liberated.

There was an interesting epilogue to this operation. The Zouaves, Spahis and FFI, as predicted, proved unable to reduce the remaining pockets of resistance, which fact prevented opening the ports. In December, as the situation appeared to have stabilized somewhat on the main fronts, two French divisions which had been weakened by prolonged engagement were withdrawn from the Vosges and started down towards Bordeaux to strengthen the forces there, and, if possible, force the remaining Germans to surrender. This movement was interrupted by the German counteroffensive through the Ardennes. The two divisions, one of which was well en route, were hastily returned to the main front, leaving the same light forces to contain the remaining Germans as before. However, these isolated enemy forces no longer constituted a serious military or political menace and their continued existence was only an annoyance.

"Independence," the shoestring operation, had accomplished its mission.

It will be said that to protect itself this nation need only rely on its machine power, that it will not need manpower.

This doctrine will be closely akin to the doctrine of negative defense which destroyed France. The folly of the Maginot line was proved early in the war but too late, to save France. The folly of the new doctrine which has already begun to take shape in the thinking of many Americans would also be proved early—but probably too late to save America.

The only effective defense a nation can now maintain is the power of attack. And that power cannot be in machinery alone. There must be men to man the machines. And there must be men to come to close grips with the enemy and tear his operating bases and his productive establishment away from him before the war can end.

General of the Army George C. Marshall

If We Should Fight Again

Major General Hugh J. Knerr, *U.S. Air Force*
Secretary-General, The Air Board

To the practical military man the last war furnished enough demonstration of how, and how not to conduct war to make evaluation thereof a simple matter. Volumes can, and are being filled with strategic, tactical and logistical evaluations of World War II. Let us see what a few paragraphs can reveal.

Men, materials and management are the basic components of military operations. The time element in modern war demands that military organization be based upon this simple triad. Time, in effect, has become the fourth dimension in this formula. Heretofore wars have been comparatively leisurely affairs wherein time was more or less of a nuisance. In future wars it will measure the relative and composite value of men, materials and management.

Time is a factor that is always in short supply. It must be conserved by forehanded decision and wise expenditure as jealously as any critical material. Once expended it is beyond replacement by more tangible means.

Poor decisions made in the planning stage can waste time that can no longer be brought back during the operation stage. Even in the last war we saw many examples of "buying time" after the operation was under way. It is highly improbable that we can do so in future wars. Conversely we must exploit time to the fullest extent as a weapon with which to overwhelm the opposition. This can be done through intelligent application of the principles of war with time as the relentless task master, both in preparation for, and the conduct of modern war.

A proper design for national security must be based upon a definitive national military policy. We did not have one prior to the last war. Such a policy is as essential to national security as is a chart to a mariner. Without it there can be no point of departure for shaping a course toward an objective. In World War II time and circumstances permitted the Commander in Chief to exploit the fortuitous economic and political factors of the early 1940's to awaken public opinion. With a pre-established military policy ready and understood internally and externally such time consuming maneuvering becomes unnecessary

With a basic military policy at hand, strategic planning is greatly simplified. Heretofore war planning had to be a "shot-gun" affair in order to cover many potential enemies. As a consequence we wasted vast amounts of time and man hours on war plans and their attendant strategic implementation that could never be used.

The cost of national security has become so great that it is necessary to select the most probable adversary and specialize our military plans and equipment to the defeat of that adversary. If another lesser enemy should arise it is not too difficult to revise our war preparations to suit his stature. Therein lay one reason

for the failure of Hitler's war. He failed to design it for the defeat of the United States.

The roles and missions of the components of the national security establishment must be clearly set forth. The indecisions and procrastinations that lead to national disasters then cannot arise. Nor can the erroneous concepts as to capabilities and limitations of sea power, air power, and military power, remain in effect.

An excess of air power, of sea power or of ground arms, is inexcusable. The result is to cripple the others through the lack of men or materials tied up in the one. Heretofore we have been able to afford the luxury of independent and self-contained security forces. This is no longer possible if we are not to court swift destruction of our defensive and offensive means.

To maintain a five-ocean navy to fight a no-ocean opponent, or to build up a huge tactical air force to support a mass army that cannot be deployed is foolish waste of time, men and resources. It is essential that we open our eyes to the fact that a navy cannot leave port until air power has secured the air space over the area in which naval forces can function. This fact was certainly spelled out for us and our enemies time and again in the last war. Yet there are those who still refuse to accept the evidence. Conversely air power cannot function except as a force in being backed up by a logistic establishment capable of maintaining the "full breakfast table," so aptly noted by Trenchard. Concurrently ground forces are impotent without the assistance and support of air and naval forces. This all adds up to a security force within which the air, military and naval forces have assigned tasks all integrated (not coordinated) into a single effort.

Industrial preparedness is as essential to national security as military preparedness. The material factor in our military equation has required an effort in past wars of an ever increasing tempo. The next one will demand a pace of crescendo proportions. The great contenders in a possible future war will first engage in the industrial and political phases of that war. The traditional weapons of war have largely disappeared. War is no longer the exclusive business of a war department of the government. State departments now fight the preliminary skirmishes of war. Any security establishment that fails to recognize this fact will be fatally deficient.

In view of the fact that major wars will hereinafter be global, the logistic function and the operational function of the national security establishment must be clearly defined and integrated.

Maximum utilization must be made of the materials and equipment of industry for war purposes wherever possible, rather than plan to use specially designed articles. The residue of the last war will be with us indefinitely, because we can not return it to industrial use, and because we designed and built too specifically and too well. We can avoid repeating this mistake only by including this objective in our industrial war plans.

The logistics of war must be attended to before operations. Too frequently in the last war we were carried away by enthusiasm for action and neglected our logistic requirements, with the result that the action had to be cancelled or delayed. In this process the logistic responsibility was blamed for failure when actually the blame rested squarely on the commander for making an operational commitment in advance of his logistic planning. This is a consequence of devoting too little time and effort to training in logistics. Heretofore "duty with troops" has been an obsession that resulted in lack of logistic know-how when the chips were down. It

is essential that we revise our evaluation of operations and logistics and give the edge to logistics.

Our industrial war planning should recognize the fact that war will not come to us as long as we keep five years ahead of a potential enemy in the technology of national security. Hitler's decision to step the incidence of war up from 1943 to 1939 was based upon his belief that the United States was too far behind in the technology of his kind of war to be able to interfere. Only the accident of Pearl Harbor upset the soundness of his decision. Even then he missed winning by a narrow margin. That margin will not be in our favor again, in all probability. We can prevent this margin by not underestimating the intelligence of our potential adversary in reaching a decision to commit war against a technically superior adversary. Development of the natural American talent for any and all types of technology offers an avenue to industrial preparedness that is at once feasible and in line with peaceful objectives. Technical skill inculcated from kindergarten to post-graduate offers a more certain security than masses of men equipped with traditional arms.

Technical skill attracts the interest of the average American to almost the same degree that military training repels him.

Compulsory separation of the individual from his home area initiates an antagonistic attitude. Development of technical skill in his home area enlists his interest and cooperation. A realistic school system incorporating the objectives of a sound reserve establishment offers the means for beginning preparedness at home.

Masses of men and machines in ground forces can no longer be depended upon to gain an ultimate victory. Technological warfare of tomorrow converts such forces into a liability very likely to be liquidated in place. The objective of modern war is no longer the armed forces of an opponent. The objective is the industrial organization and resources of the enemy. Such armed forces, ground, sea or air as are encountered are incident to attainment of the industrial objective.

The highly technical demands of a modern airborne army can be met through security education more successfully and economically than through military training of the "squads east and west" variety. The manpower required for consolidating and securing the decisions gained by air power should be a by-product of a national security program rather than the primary objective of a universal military training program.

The last war clearly demonstrated the fact that local forces in federal service are unrealistic. At the very time in a future war when these local forces will be needed in their home areas to cope with dozens of simultaneous "Texas City" disasters, they will be moved out in federal service under present plans. Where the existence of the United States is concerned we can not temporize with political expediency, local pride or emotional approaches to this problem. There is but one realistic answer and that is to retrain our local forces for the job to be done in home defense.

The last two wars have revealed the strength and weakness of our reserve establishments. The needs of the next war require that there be but one reserve system responsive to the needs of the national security establishment. Competition for reserve brain and manpower constitutes a menace to our security as a nation.

The potential weapons of a future war make dependence upon surface transport, land, or sea, a hazardous assumption.

Rapid application of force, prompt change of base, quick evacuation and cer-

tain maintenance, demand primary dependence upon air transport and secondary dependence on ground lines of communication.

The type of army required for specialized warfare with a probable enemy is one that can be quickly established and maintained in the "areas of contact."

Time and manpower wasted in forward areas through loading and unloading transport should be eliminated through use of pre-packed and pre-equipped "pods" deposited by air carriers. The implications of modern war indicate the necessity for frequent and rapid evacuation of contaminated areas. The fewer men involved, the greater the mobility of the activity The less contact with ground surfaces, the greater the security against immobilization due to chemical and biological contaminations.

The development of the pod type of transport fits well into any program for the maintenance of a healthy aeronautical industry. The air freight carrier has not yet made its appearance as a serious competitor with surface freight carriers. Eventually it will. The pod offers the logical approach and is equally useful for military purposes. In this type of transport the wings, power, crew space and control surfaces are a unit from which the cargo container is detachable. The containers can be provided in any desired ratio to the aircraft and can be fitted out for living quarters, machine shop, photo laboratory, hospital unit, fuel cells, bulk cargo, communications, etc. Through the use of caterpillar landing gear these pods of men and equipment can be deposited in presently inaccessible areas, maintained and evacuated without resort to surface transport. This type of transport provides the mobility essential to ground forces operating in close harmony with air forces. It is this type of mobility that a George Patton of the next war will exploit to the fullest extent. When he does, he will demonstrate the thesis that masses of men are no longer significant as such. It is the speed with which they are applied that counts. War then resolves itself into the simple formula: $E = MV^2$, wherein "E" is the effect produced, "M" the mass of men, materials and management involved, and "V" is the time element in terms of velocity of application. Equate your formula against the enemy's and the decisive factor is "V."

Finally, in view of the conflict of ideologies since VE-day, the public must be informed of the current threats to our continued independent existence. The case examples of countries recently and currently overrun and captured as swiftly and certainly as if by armed invasion must be interpreted as sign posts along the road to our own fate. This was not done prior to the last war. It is not now being done. Section V of the National Defense Act establishes the means for doing so. Let those responsible see to it before the opportunity passes.

No country is so remote from us that it may not some day be involved in a matter which threatens the peace. Remember that the first World War began in Serbia; that the peace of Versailles was first broken in Manchuria; and that the second World War began in Poland. Who knows what may happen in the future?

President Harry S. Truman

Campaign for the Northeast China Railway System (1946-1947)

Major Robert B. Rigg, *Cavalry*
Assistant Military Attache, Shanghai, China

IN mid-March 1946, the Chinese Nationalist Government's New First and New Sixth Armies entered Mukden in rear of General Chao Kungwu's Fifty-Second Army which, only a few days earlier, had secured the city and was driving eastward to Fushun. The primary mission of the New First Army was to drive north from Mukden and secure intact as much of the Chinese-Changchun Railway as possible. The New Sixth had generally the same mission, but it was committed south along the same rail line in the direction of the industrial center of Anshan. Both Nationalist Armies had fair opposition from Chinese Communist Forces then in possession of all outlying territory, and the latter were determined to stop Central Government advances into Northeast China (Manchuria). Thus began the battles for the major railway lines in Manchuria.

On 13 March 1946, the Chinese-Soviet operated Chinese-Changchun Railway was intact and operating on schedule. As both the First and Sixth Armies' spearheads swung north and south from Mukden, Chinese Communist units began dynamiting and burning bridges in an effort to thwart the Nationalist movement, and at the same time making slow withdrawals in face of their enemy.

Although the New First Army units marched fast, they were able to secure only about forty-five miles of the railway intact. North of Tiehling, Chinese Communist brigades conducted a methodical rearguard action and destroyed most of the rail bridges as they fell back on the important rail junction of Ssupingkai. This slowed up the advance of Nationalist troops, who, when the latter finally did reach Ssupingkai, possessed roughly seventy-five miles of damaged railway line.

The rear guard action by Chinese Communists ended at Ssupingkai, where for the first time in Northeast China they chose to fight on a fixed front. The Communists had ample time to prepare their Ssupingkai defenses and trench works, as Lieutenant General Tu Yu-Ming's Nationalist Forces (NECC) were slow in bringing a preponderance of strength to bear at Ssupingkai, because of the ruined highway system and the damaged rail line. However, a large battle gradually developed around the Ssupingkai area, and the Communists stopped the northern advance of their enemy.

Meanwhile the New Sixth Army under General Liao had fared about the same as the New First. It secured the railroad to Anshan, against small opposition, but south of there the Chinese Communists were active in the destruction of bridges. Skirmishing continued, but no great battles developed on the Southern Front.

Thus, by 20 March, service on Manchuria's most important rail line had come to a standstill; traffic between Dairen,

Mukden and Changchun had ceased. Considerable damage to track and bridges had been done, but as the fighting progressed unabated until June, more was to take place, with the result that the transportation maps of Northeast China had to be altered seriously.

Communist Strategy: More destruction has been wrought against rail bridges than against any other single military targets in Northeast China. All of this damage has been done by military engineers and none by bombing. No combat aircraft was in use on the Nationalist side until mid-April 1946. The Communists had no combat aircraft, and still have none.

The Manchurian railway system is quite vulnerable, by virtue of the many bridges on the rail lines. Chinese Communist military leaders took this into consideration and based a large part of their strategy on the destruction of bridges so as to cripple lines of communication in Nationalist areas. For each region the Central Government troops won, they assumed the burden of a ruined rail system, and rarely did the Communists withdraw over a line without damaging it thoroughly.

Once General Tu Yu-Ming's Northeast China Command had completed the temporary repair of a rail line, it had to garrison and defend it from future attacks and raids. This resulted in considerable expenditure of military personnel, and still is a drain on the command as a whole. A bridge requires from four men to a platoon, depending on its size, and, for example, along the 192 mile Changchun-Mukden line there are approximately thirty-six bridges. This is an average of a bridge every 5½ miles, and it is only part of the rail system in Jehol and Northeast China that must be guarded. The most important aspect of the Communist strategy is, of course, the fact that the rail lines, even after repair, are not as efficient as before. Most double tracked rail lines in Northeast China are now, in effect, single track lines, because no real permanent repair has begun.

As the Manchurian highway system deteriorated during the war, the railway assumed even more importance in the economy of the area. This is further emphasized by lack of gasoline, oil and motor transport in Manchuria.

Both military sides use rail lines heavily, and little use is made of motor transport by U.S. Army standards. Considerable numbers of horses are used by both belligerents for transport.

As Nationalist troops have relied primarily on railroads for troop movements and hauling of supplies, they could not gain a preponderance of strength at any one point before repairing rail lines thereto. On the other hand, the Communists possess an almost undamaged system of rail lines in their area.

During 1946, the Chinese Communists were never constantly strong enough to fight continually on a fixed front with the Nationalists. Their strategy has been predicated on rear guard actions coupled with extensive rail destruction, and supplemented with counterattacks, and raids. They based their strategy on their capabilities. They methodically tore up tracks, blew bridges, and then sent raiding parties to repeat these tactics in rear areas after lines had been repaired. It was this type of warfare the Chinese Communists could best afford, and they achieved maximum benefits for the small number of troops involved. Their destruction of rail lines, more than any other aspect of their strategy, slowed up the Nationalist occupation of Manchuria. The Communists can be expected to continue their rail destruction if Central Government Armies move against them. The Manchurian railway system is already badly damaged, but it

is scheduled for even more destruction as the Chinese Civil War continues.

The Battle of Ssupingkai: Up until the Chinese Communist Forces stood fast at Ssupingkai, the general pattern of Communist tactics had been to resist Kuomintang advances up to where the losses in battle were not too great. In short, they had fought rear guard actions, but had never become involved in a prolonged battle.

In April 1946, General Lin Piao regrouped his Communist Forces around Ssupingkai to:

(1) Prevent the Nationalists from reinforcing or reaching the 12-14,000 Central Government troops then isolated in Changchun.

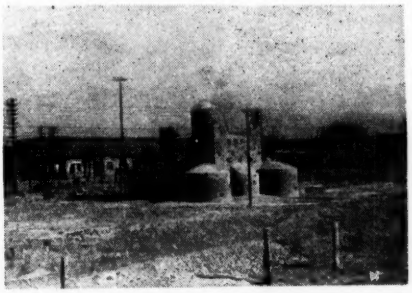
(2) Give real battle to the Nationalist Armies for the first time in the hope of destroying the main body of General Tu Yu-Ming's force.

(3) To retain possession of the important east-west railway connecting Tungliao and Hailung.

The Communist general knew that he had chosen the ground, and that before the Nationalists could seriously oppose him on that front they would have to repair the railway from Mukden. There was a fair chance that the Nationalist Forces could be defeated piecemeal before a real striking force was built up.

For several weeks the Chinese Communists succeeded in holding the advantage over the NECC Forces. The 14,000 Central Government troops which had been flown from Peiping to Changchun were cut off from any support. After the Soviet Army units withdrew from Changchun, the isolated garrison there was attacked by 20,000 to 30,000 Communist troops under the able leadership of General Chow Pao-chung. In a few days of hard fighting, Changchun fell to the Communists; the garrison that fought so well was decimated, and its wounded commander taken prisoner.

Meanwhile, the battle of Ssupingkai was reaching its height, but the Nationalists could not break through. Once again, VMI trained General Li-Jen took over his New First Army, after having just arrived from duty with the United Nations Organization. However, it required another force to swing the balance on this front of some thirty-five miles, so General Liao Yao-Shiang moved his New Sixth Army up to the east of Ssupingkai. The appearance of an entire new army on the

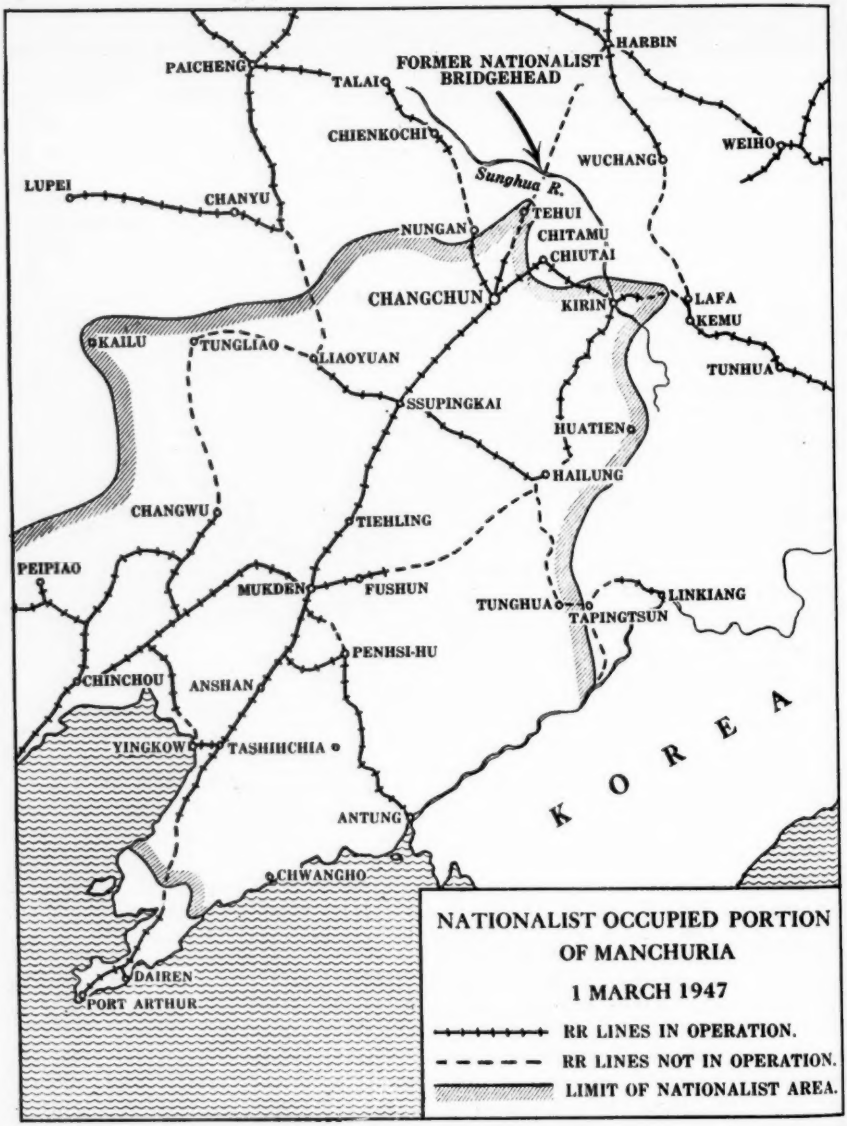


Pillbox constructed at a railway station by Chinese 10th Engineer Regiment (Nationalists). Such pillboxes are essential to defense of railway stations and large bridges. (Photo by Author.)

Communist left flank caused Red General Lin Piao to shift his strength from the center to the east flank in the hope of quickly defeating the New Sixth and then shifting his main body into the line against the New First before the weakness in the center was discovered. (Note: Lin Piao's G-3 admitted this was the plan. The G-3 was captured by Nationalists at Ssupingkai a few days before it fell.) He was unable, however, to do this.

The Communist Eighth Route Army and New Fourth Army troops, which had captured Changchun, reinforced the brigades on the Ssupingkai front.

For the first time in 1946, the Nation-


HARBIN
PAICHENG
FORMER NATIONALIST BRIDGEHEAD
TALAI
CHIENKOCHI
WUCHANG
WEIHO
Sunghua R.
LUPEI
CHANYU
TEHUI
NUNGAN
CHITAMU
CHIUTAI
CHANGCHUN
KIRIN
LAFA
KEMU
KAILU
TUNGLIAO
LIAOYUAN
TUNHUA
SSUPINGKAI
HUATIEN
HAILUNG
CHANGWU
TIEHLING
PEIPIAO
MUKDEN
FUSHUN
TUNGHUA
TAPINGTSUN
LINKIANG
PENHSI-HU
CHINCHOU
ANSHAN
YINGKOW
TASHIHCHIA
ANTUNG
KOREA
CHWANGCHO
DAIREN
PORT ARTHUR
NATIONALIST OCCUPIED PORTION OF MANCHURIA
1 MARCH 1947
RR LINES IN OPERATION.
RR LINES NOT IN OPERATION.
LIMIT OF NATIONALIST AREA.

alists were using aircraft in the Civil War. Ssupingkai was bombed and strafed daily by B-25s and P-51s operating out of Mukden.

On 14 May, General Tu Yu-Ming's armies quickened the pace of battle at Ssupingkai. A few Japanese tanks had been brought up from North China and were put to use on the Nationalist side. By the 18th, the Nationalist offensive was at its height, and the outflanking movement of New Sixth Army had drawn out some of Lin Piao's best units from the center of the front. Tu Yu-Ming's armies forged ahead in all sectors with the steady support of all artillery available. General Sun Li-Jen felt the weakness to his front, and the New First Army led the way into Ssupingkai where the already defeated Communist Brigades were beginning to withdraw. General Lin Piao was never able to swing his main force back to the center; instead he ordered a withdrawal of all troops on 19 May 1946. This ended the artillery duel, trench warfare phase of the Manchurian Civil War. In the five weeks of fighting, both sides suffered heavy casualties. The 38th Division (NFA) surgeon stated that the daily casualty rate at Ssupingkai was far in excess of that in Burma. The Communists had greater losses, due to the excellence of Tu Yu-Ming's artillery and the bombing and strafing.

The two forces momentarily broke contact on the night of 19-20 May. The Communists began a hasty but methodical withdrawal toward Changchun. Once again their rear guard action was such that it enabled them to do the most thorough job of railway bridge destruction ever accomplished in Northeast China. As they dropped back on Changchun, they blew every one of the eleven bridges and tore up miles of track.

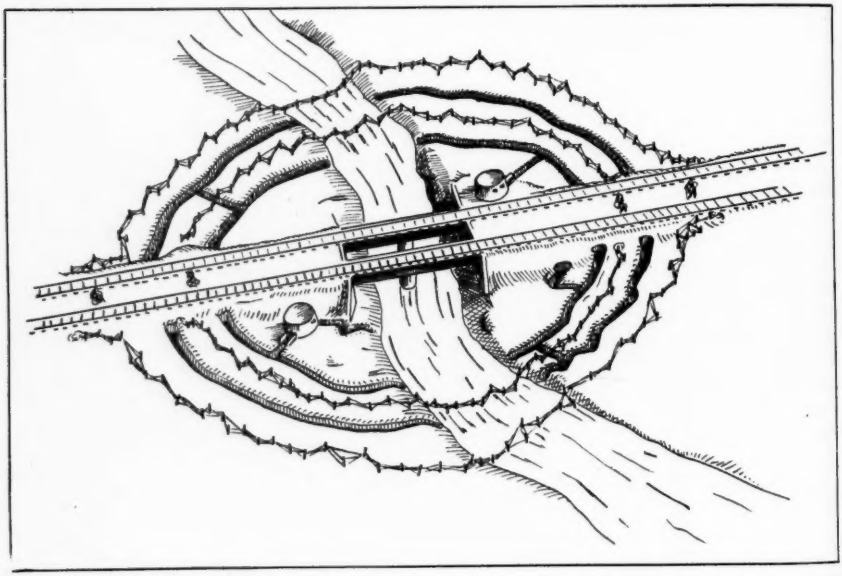
Race for the Sungari Bridgehead: There was no second battle for Changchun. General Tu Yu-Ming's troops made steady advances and entered Changchun on 23 May 1946. From there they raced to secure the kilometer-long railway span over the Sunghua (Little Sungari) River. By rapid marching, the NFA's 50th Division reached this giant structure and managed to brush away Communist resistance before the latter had a chance to mine it. This bridge is one of the largest on the Chinese-Changchun Railway. Central Government units were poised for an advance on Harbin when a temporary truce agreement was signed for Manchuria. This took effect on 6 June. However, just before, the Communist commandos managed to destroy three spans on this bridge.

Destruction of the kilometer-long single rail bridge over the Sunghua (Little Sungari River) between Harbin and Changchun. View is north showing the blockhouse which is the main strongpoint of the Nationalist's small bridgehead here. Front line is 500 yards north of the blockhouse. (Photo by Lt. Col. Edward T. Cowan.)

The "Peace Period": From June until October 1946, there was virtual peace in Manchuria, except for innumerable skirmishes which the various truce teams were obliged to investigate. During this period, the Mukden to Tientsin rail line, the single artery of supply for NECC forces in Manchuria, was cut several times by Chinese Communist raiding parties who mined tracks and blew up the bridges.

In October, two armies (the New Sixth

and the Fifty-Second) under General Tu's leadership, made the skillful and well planned drive that resulted in the capture of the port city of Antung on the Korean-Chinese border. The main effort of the drive was that of the Fifty-Second Army which marched southeast from Penhsi-hu along the double tracked rail line. The area northwest of Ssupingkai and destroyed a section of the Mukden-Changchun railroad; their first move was a night attack on a small bridge north of Ssupingkai. A day later they succeeded in wrecking a small train load of Central Government soldiers dispatched to the area. The line was out for only a few days, and in



Normal defense works placed around all bridges held by Nationalist Government troops in Northeast China. Barbed wire fences and entanglements supplement trench defenses. Each bridge has at least one pillbox; some three.

latter traversed mountainous territory and contained quite a few bridges and tunnels. As might be expected, the Communists destroyed as many of these as they could. Damage was only thorough, however, along a thirty kilometer stretch where the Chinese Reds concentrated on six bridges and tunnels. Two months later the line resumed operation, but on a one track basis only.

In mid-November, a mixed demolition and raiding party swept down from the typical fashion, the Communist unit withdrew.

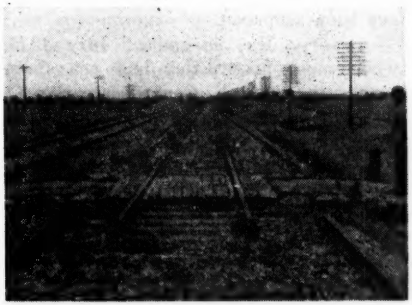
Within a week there was a small attack on the Changchun-Kirin rail line. Again a bridge was blown up. Nationalist military engineers completed the repairs, some of it while under fire; but five hours later the Communists were back, and had blown the bridge again.

While these moves were mainly harassing in nature, nevertheless they fitted in with the general scheme of Communist

strategy in November 1946. During that month, the Communists secretly massed and formed a new army, the Third, (about 15,000 men) to the northwest of Changchun. This army attacked the town of Nungan, near Changchun, and threatened other points along the New First Army's left flank. By cutting the Kirin and Mukden rail lines, the Chinese Communists momentarily kept the New First Army from moving troops from its right flank to the left, and it also prevented General Tu Yu-Ming from reinforcing the New First from Mukden. For some unknown reasons, however, the Communists neither fully carried out their offensive, nor made any further effort to keep the rail lines severed. Actually, the New First Army later did shift most of a division from the east to the west flank, and drove the Communists out of Nungan. In retrospect, the Communist move seemed designed to divert Nationalist attention away from any offensive moves in the direction of Harbin, and it did have the effect of placing the Nationalists more or less on the defensive in the North.

A much larger Communist offensive opened on 6 January 1947, and continued for almost two weeks when they crossed the Sunghua (Little Sungari) in the area northeast of Changchun. There was fighting and maneuvering over all the Northern Front, but the main Communist effort was on the northeast. The Communist main body made a surprise crossing of the frozen Sungari and attacked the Nationalist garrison at Chita-mu northeast of Chiutai; next, the Changchun-Kirin rail line was cut. Power lines were downed near Kirin, and Changchun was under a blackout. Bearing the brunt of this attack was the New First Army which about 10 January 1947 committed its reserve, and the Communists pulled back slightly.

As the fighting became more and more serious, the Nationalists requested the withdrawal of the U.S. truce team then at the Sunghua (Sungari) bridgehead. The team experienced difficulty in withdrawing, because the rail line from Changchun to the bridgehead had been cut in several places. The team finally made its way out in jeeps. Feeling that to hold the bridgehead with large numbers of troops would be ill advised, the 50th Division commander withdrew all but one company from the area to the town of Tehui. The infantry company on the Sunghua suffered fifty per cent casualties, but held the crossing, not knowing that most of the 50th Division was virtually surrounded at Tehui. The arrival of other troops between Changchun and Tehui altered the Communist offensive, and it began to dwindle fast. By 17 January, NECC aircraft observers noted that the Communists were beginning a withdrawal. During all this time, the Nationalist aircraft had been strafing and bombing the Communists. The Communist 1st, 5th, and 7th Divisions suffered fairly heavy losses from air attacks while the New First Army suffered about two thousand casualties in the ground actions. The situation was always quite



Hasty removal of railroad track near Mukden. All ties have been removed, but track remains. Often the Chinese Communists invite farmers to remove and keep the sleepers for use as firewood. (Photo by Author.)

fluid, and there was much maneuvering, which led newspapers to believe that Changchun was to be attacked. It might have been had it not been for the skillful countermoves of General Sun Li-Jen's forces.

In late February 1947, the Communists again crossed the Sungari River, and on the 24th, they attacked New First Army units, northwest, north and northeast of Changchun. In effect, this drive opens a new phase in the Northeast Civil War. The period of "peace" is ended. Hostilities have been reopened.

Summary: By the end of June 1946, (when most hostitilities had ceased in Manchuria through General George C. Marshall's efforts) Nationalist Armies occupied roughly one-tenth of Manchuria's area, and they had in their possession twenty-seven of the fifty-four major railway bridges in Northeast China. Of these twenty-seven, some fifteen had at one time or another been destroyed, either in part or completely. All have since been temporarily repaired.

By March 1947, the Nationalists held about twenty per cent of the area of Northeast China, but had only a few of the more important bridges.

While railway lines are operating in both Communist and Nationalist areas, considering Northeast China as a whole, the railway system is crippled. Where double tracked lines existed, only single track lines remain. Train service in both areas is slow, and well below the par of efficiency it was up to in March 1946.

Since summer of 1946, there has been little progress in direction of permanent railway line repair within Nationalist territory, and for lack of coal (sources of which are in Central Government area) the Chinese Communist operated lines are used mainly by the military.

Highways and highway bridges in Manchuria are in even worse condition than the rail. Only a few road bridges have been repaired. There is hardly a semblance of motor traffic outside the cities. To meet a car on a highway in Northeast China is a novelty.

The outlook on the restoration of communications systems in Northeast China is dim. At this writing in Changchun, there are new battles only twenty miles from the city, and rail lines to the northwest, north and east are again severed.

No permanent repairs to communications in Northeast China can or will begin until Civil War in China ceases. If the war continues with any advance on the part of either side, more railway destruction can be expected.

Because we disapprove of the use of force in the settlement of international disputes, we cannot renounce that force while other nations cling to theirs. Our pleas for peace are measured not by the sincerity with which they are spoken but by the strength we can array to enforce them.

General Omar N. Bradley

Universal Military Training

A summary of the Report of the President's Advisory Commission on Universal Training.

Colonel Conrad G. Follansbee, *Field Artillery*
Instructor, Command and General Staff College

ON 20 November 1946, President Truman requested nine prominent citizens to serve on an advisory committee on Universal Military Training. The committee, headed by Doctor Karl T. Compton, after extensive research study and deliberation, and after hearing some 200 witnesses, representing all segments of the public, rendered its report on 29 May 1947. The title of the report is "A Program for National Security," and the cover page indicates that it is the "Report of the President's Advisory Commission on Universal Training." It will be noted that the Commission very properly widened the scope of its inquiries to include broad problems of national security, and it will be noted also that the Commission did not confine its report to military training alone, but included other types of training for young men, who for some reason or another, would not be available for military training. However, their recommendations with respect to non-military training were general in nature and subject to further study.

The document, for sale at the Government Printing Office in Washington is perhaps the most important summary of the military requirements of the United States which has been published in our generation, because of the caliber of the Commission's membership and the civilian viewpoints expressed. Its compelling logic should be made available to all citizens, to assist them in arriving at sound conclusions concerning vital issues which now face our people and our Congress. Certainly every officer of the armed forces should be acquainted with the contents of this report.

This article attempts to summarize this important document for those whose limited time deters a reading of the full report, but no summary of this length can hope to present the subject so well as the report itself.

The Commission strikes a keynote in one of the early paragraphs of the report; "The only basis on which Universal Training should be accepted, in our opinion, is a demonstration that it is needed to insure our safety in a world in which peace is not yet secure. We are convinced that such training is an essential element in an integrated program of national security designed to protect the United States against possible aggression, to perpetuate the freedoms for which millions shed their blood, and to hasten the advent of universal disarmament and peace, through the United Nations. . . . we are convinced that without Universal Training the Nation's defense would be incomplete and inadequate."

Unless otherwise stated, the paragraphs which follow are summaries of various portions of the report of the commission. The paraphrasing is believed to adhere faithfully to the intent of the original text.

The World Situation and the Preservation of Peace

The only real security lies in the abolition of war through the establishment of the reign of law among nations. The United Nations embodies our hopes for a durable peace. The United States has committed itself to a position of leadership in building the United Nations into an effective instrument for banishing war. But at the very time we have assumed this commitment, we have allowed our military strength to fall away from us.

For a few years our monopoly of the atomic bomb and the availability of millions of war veterans may serve as insurance against direct attack, but the rapid drop in the state of our military readiness will encourage would-be aggressors, and weaken the faith of our democratic friends in our will and ability to make real the principles for which we stand. The blandishments or threats of competing ideologies will tend to spread totalitarianism, increasing our peril and decreasing the number of our peace-seeking friends.

Ample evidence is available to prove that Hitler counted upon the weakness of the democracies in planning his wars of conquest. It is apparent from the lessons of history and from the experience of the post-war period that the only way in which we can lend authority to our voice in international affairs and inspire confidence in the ability of the United Nations to enforce peace, is to maintain our Armed Forces at a level of efficiency and comprehensiveness that will defy challenge by would-be aggressors. A weak nation can only beg, not command respect and reciprocity.

Nature of Possible Future Warfare

A nation bent on conquest can prepare in advance and select its own time, place, and mode of attack. Under its constitution the United States cannot, and thus must prepare against every type of attack, from any source. Because of its wealth and its potential ability to thwart any attempt at world domination, the United States is a prime target for future aggression.

Long range aircraft now make it possible to deliver an attack across an ocean or the polar cap with increasing intensity and suddenness. Weapons of mass destruction have been added to the devastating strategic warfare of World War II, and "Pearl Harbor" attacks are vastly more probable. We will never again have months to mobilize, train, and equip an effective fighting force. The speed and force of future attack make imperative the maintenance, in a constant state of readiness, of a counterattacking force which can retaliate instantly with the most modern and powerful weapons. Under these conditions every city, every factory and every farm would become part of the combat zone. Fifth column activities would precede attack upon us paving the way for disunity and surrender.

The report of the Commission sets forth its views on the ways in which the United States might become involved in war, and the probable nature of such wars:

a. Direct attack by a powerful enemy or combination of enemies at such time as the potential aggressors can produce atom weapons or other mass destruction weapons in quantity. Such an attack would be preceded by softening-up activities by subversive agents and their domestic allies and dupes, using espionage, sabotage and propaganda. Initial objectives of such attacks would be to immobilize us militarily, industrially and politically, and to create panic and demoralization among the civilian population. Efforts would be made to cripple or destroy our facilities for striking back.

b. Involvement in war through the aggressive tactics of some nation against its neighbors in a distant part of the world, which we and the United Nations

could not countenance because of the potential threat to world security, or because our international conscience would not permit us to stand passive while the rights and liberties of others were transgressed. The aggressor would start with political infiltration, followed by military and political domination, in the hope of increasing his overall resources and improving his geographical position before becoming involved in war with the United States.

c. Effort of a powerful European or Asiatic nation to gain a foothold in Latin America. Political penetration would seek to extend the circle of our enemies, with more overt forms of aggression a logical result. We must defend against this possibility by the vigor of our own example and by the extension of economic aid to world democracies.

d. Policing action against a small nation menacing the peace and security of other nations, independently or in conjunction with other United Nations. Such a minor action might be the spark to ignite a world conflagration, which would find members of the United Nations arrayed against one another.

The Commission concludes that the era of push-button warfare is not yet arrived, although it concedes that another twenty-five years may witness the development of weapons which can wipe out millions of people overnight. The Commission apparently agrees with the view that any war in the foreseeable future will commence with sudden and devastating air raids on centers of population and important industrial and military objectives, followed by landing of airborne invaders. Under such circumstances the Commission sees two principal military needs:

a. An airborne striking force in being, composed of highly trained professional troops in a constant state of alertness, to intercept enemy attack, prevent follow-up attacks, to retaliate against the enemy, to dislodge him from bases he is using, prevent his acquiring other bases, and to gain for ourselves bases close to the enemy homeland.

b. Trained men in every part of the country ready and able to meet disorder, sabotage and invasion.

Future Needs for Trained Manpower

The Commission devotes considerable space to a discussion of the continuing need for trained manpower in future warfare. It points out the need for professional land, sea and air forces for interception and counterattack, and considers the tremendous tasks of "civilian" defense in areas which have sustained devastating attacks as complex and urgent, and needing a ready force of well trained and disciplined manpower. The Commission concludes that local defense forces must be military in character, and must be provided by civilian components of the Armed Forces. The Commission foresees the need for land armies, and naval forces, as well as air forces, in the struggle for vital bases which will follow the initial blows.

The outcome (of any future war) may not be determined by superiority in weapons of mass destruction. We may have to employ traditional strategy, as for example, if any enemy were to seize friendly territory as bases. We could not subject our friends to atom bombing. Atom bombs may not end a future war as they did the war with Japan. (The Commission infers that the war with Japan had been won before the atom bombs were used and that they were but the "last straw.") We cannot rely exclusively on atomic warfare. We have no evidence of our ability to conduct long range mass atomic war under conditions lacking the element of surprise. The United States cannot face the future without large reserves of men trained and disciplined in the use of the weapons and techniques of war, to ward off the first blow and retaliate, to secure bases and

to man the ships and planes needed for counteroffensive action, to invade, to repel invasion, and to occupy conquered territory.

To shut our eyes to the continued necessity of these functions and rely on the vague prospect of guided missiles would be criminal negligence. *The United States cannot continue to be the only major power without any system of military training for its citizens.*

Essentials of an Integrated Security Program

The report of the Commission then proceeds to set forth its views as to the essentials of an integrated national security program. In introducing this topic, the report comments "In attaining national and world security we must build upon the unity of our people and the vigor and vitality of our democracy. We must battle economic instability, racial discrimination and group conflict, as food for hostile propaganda machines."

The first need seen by the Commission is that of a strong, healthy and educated population. The Commission points out that this is *not* a part of the military training job, although it views military training as contributing indirectly to this objective.

The report refers to the necessity of a coordinated intelligence service, a vigorous and continuous program of scientific research and development, and the stimulation of the training of scientists and engineers, as security essentials.

In discussing industrial mobilization the report advocates industrial readiness for war, the provision of the latest weapons to the Armed Forces at all times, despite the expense of constantly scrapping obsolescent matériel. Dispersal of essential war industry is recognized as a need, with a suggestion for federal financing of the peace-time construction of underground industrial facilities. Dispersion of government agencies is advocated, and the need of a large and healthy merchant marine is pointed out.

The report refers next to the need of regular armed forces to comprise a striking air force and forces required for general counteroffensive action. While not specifically referring to the National Guard and Organized Reserve in this section, other sections of the report dwell upon the necessity of strong effective reserve components, the maintenance of which would be one of the most important objectives of the Universal Military Training plan. The impracticability of recruiting and maintaining a professional force in itself large enough to meet all the demands of war, is noted.

Finally the Commission lists Universal Training as an essential of security. "To meet universal attack we must have trained men everywhere. We do not believe there is any other way of guaranteeing that the Armed Forces will be able to count on a sufficiently speedy flow of trained men to win a war, if large scale fighting for bases or invasion of the enemy homeland are needed. But even more immediately and even more certainly, these pre-trained young men will be ready to cope with the unprecedented problems of internal security which atomic war will bring."

The danger of considering Universal Military Training as a panacea is stressed. There is a danger that Universal Training will lull the country into a false sense of security to the neglect of the other essentials of security. The training plan is only one part of the entire program proposed by the Commission, all of the parts of the program being considered equally important. The report quotes Mr. Bernard M. Baruch as saying, "Universal Training must be considered as the apex of a pyramid grounded on the broad bases of industrial preparedness, military intelligence and other essential elements. Only

if combined with a sound and comprehensive plan for National Security can it (Universal Training) be effective."

Before describing the plan which they recommend, the Commission outlines the role of Universal Training. Pointing out that war in the predictable future will require *more* and not *less* trained men, and that in World War II our Allies gave us the time to mobilize and train our forces, the statement is made that Universal Training will enable us to stockpile the time needed to train additional manpower, will provide an indispensable base of training to build up the civilian components, and will shorten mobilization and war training.

Military training will initiate our young men into the ways of the Armed Forces and enable them to make psychological adjustments more readily. It will familiarize them with weapons, teach them to think like soldiers in emergencies, accustom them in group action, and will assist in the selection of leaders.

The civilian components cannot be maintained at strength by voluntary methods. The pre-war National Guard of 200,000 had only sixty-five per cent of its assigned personnel effective upon mobilization. It had depended upon recruits without prior military training and was constantly retarded in its training by a high turn-over rate and by the necessity of imparting basic instruction to the new men. It was consequently incapable of swift welding into cohesive and disciplined units, and took many months of preparation after it was called into Federal service to prepare for war service. The Organized Reserve is obviously subject to the same handicaps to an even greater degree.

Universal Training, calling for six months of basic training in camps or on shipboard followed by service with the reserve components of the Armed Forces, would give the National Guard and Organized Reserve a steady flow of pre-trained men and a state of readiness, otherwise unattainable. It would, moreover, improve the alertness, efficiency, and quality of the regular forces, by giving them a challenging job and something to work with, and by making them responsible to a public more than ever interested in the activities of the Armed Forces.

It would produce leaders (reserve officers) and would provide a continuously replenished pool of young, physically fit and trained reserves located in every community of the nation, for defense and disaster action, and to provide the needed manpower for a war-time Army and Navy.

The Selective Service System which would have to be operated in connection with Universal Training would enable us to maintain a continuous inventory of military skills, aptitudes, and leadership qualities, which would permit prompt and effective war-time assignment of personnel.

By bringing together young men from all parts of the country and from all walks of life to share a common experience and to fulfill a common obligation, Universal Training should contribute to national unity.

Cost of Universal Training

In discussing the budgetary aspects of Universal Training the Commission points out that even if we could get enough volunteers for the regular forces, the cost of the professional force which would be needed without Universal Training would be ruinous, not to mention the constant large drain upon the productive labor force of the nation. The cost of Universal Training for a year ($1,750,000,000) would be less than the cost of one week of World War II, and would be less than ten per cent of the amount that the American public now spends annually on tobacco, cosmetics, liquor, amusements, and jewelry. With Universal Training, economies

might be possible in the regular forces' budgets as a result of the smaller forces which would be required and the saving in training time.

Dangers in Program

The Commission views as a danger the possibility that the cost of Universal Military Training will result in withholding funds from other equally vital security measures. The cost of the entire security program will be staggering, but the question is how much are we willing to pay for avoidance of the incalculable horrors and cost of another war? The possibility that public interest may dwindle after the program is in operation and that pressure for abandonment or deterioration in the quality of training may ensue is mentioned. Universal Training is not a short range program. If authorized now it could not develop its full security potential until 1953 or 1954. The public must give interest as well as financial support to the program, and must be alert to its continued effectiveness.

The Commission dismisses the more common arguments against Universal Training (undemocratic, war-like, militaristic, a misuse of funds needed for education, high taxes, etc.) tersely and effectively, and then proceeds to set forth what it conceives to be the objectives of Universal Training.

Objectives of Universal Training

Pointing out that military training is not a substitute for the influence of the home, the church, and the schools, in matters of health, education, citizenship, and morals, the Commission says that military necessity is the prime consideration in connection with the plan. The plan must be universally applied, and none exempted, except those who can make no useful contribution to the national security. There must be equality of privilege and opportunity, and the program must be a responsibility of the people as a whole.

General Structure

The general structure of the Universal Training program is seen by the Commission to rest upon the obligation of every male American upon reaching age eighteen, to undergo a period of training to fit him for service to the nation in a future crisis, this training to be predominantly military, those unfit for military training receiving some other useful training, concerning which the Commission indicates that further study is necessary.

The training envisaged is to be divided into two periods, the first a period of six months full time training in camp or on shipboard, and the second a period of part time training under one of several optional plans involving varying periods of time. The first phase would be devoted primarily to basic individual training while the second phase would continue individual training into more advanced stages, would permit unit training (in the reserve components of the Armed Forces) and provide officer training for qualified trainees (in colleges).

Control and Supervision

The Commission recommends that top control be exercised by a full-time commission appointed by and responsible to the President, to consist of three members, two drawn from civilian life, and one an officer of one of the Armed Forces. This commission would establish policies and standards, determine the Universal Training budget needs, and sub-allocate to the operating Armed Forces the funds authorized by the Congress for the execution of the Universal Training mission.

The Universal Training Commission would be assisted by a permanent staff of employees, and by an advisory board of fifteen to twenty-five members appointed by the President, of whom at least three would be officers of the Armed Forces. The other members of the Advisory Board would be drawn from civilian life, and

would be representatives of public interests, religion, health, education and recreation. This Advisory Board would conduct special studies for the Universal Training Commission, review the nonmilitary aspects of the military training program, cooperate with the Armed Forces, and advise the controlling commission. They would be paid only for actual time spent on Universal Training work. In addition, the Universal Training Commission would have a staff of full-time, well paid inspectors, who would constantly inspect the operation of the program by the Armed Forces and report thereon to the Commission.

The Army, the Navy, the Air Force, and the Coast Guard would operate the military training program for those persons allocated to them. In each community near a Universal Training Camp, a volunteer civilian advisory commission is recommended, to work with the local commander in matters affecting the health, morale, welfare, and morals of the trainees.

Registration and Selection

Universal Training would require establishment of a Selective Training System patterned after the Selective Service System of World War II. A civilian appointed by the President would head the National Selective Training Office and local boards would be established in every community in the same manner as those of the Selective Service System. The selective organization would function under general policies established by the Universal Training Commission. The local boards would register all male citizens as they became seventeen years of age; determine whether they were fit for military training, and if not, for what other type of training; pass on requests for temporary deferment and prescribe the time at which individuals would commence their training. In addition, it is considered that the local boards would accomplish a large part of the physical classification and aptitude and intelligence testing normally associated with induction processing. Upon completion of basic training, the local boards would also be responsible for supervision and enforcement of performance of the optional phase of training. Finally, these boards would maintain a registry of men who had received training in the preceding six years.

All male Americans would be required to register at age seventeen, and would be liable for training upon becoming eighteen, or upon finishing secondary school if later, but in any event would be required to commence training before attaining their twentieth birthdays. Those who have finished school between seventeen and eighteen years of age could, with their parent's consent, enter upon training before their eighteenth birthdays.

It is estimated by the Commission that 1,100,000 young men become eighteen each year, of whom 50,000 would be unfit for any training.

It is estimated that between 100,000 and 150,000 young men would voluntarily enlist in one of the regular Armed Forces each year, prior to commencing Universal Training, and thus be exempt from the latter. This would leave, according to figures given in the report, between 750,000 and 950,000 men entering the Universal Training Program annually.

Status of Trainees

During the six months period of basic training the trainees would be under military control, but would not be members of the Armed Forces, nor be subject to the Articles of war. A special code of conduct would be adopted by the Congress to govern the trainees. All training would take place in the United States (or in its territories or possessions in the case of those resident therein), or on ships of the fleet designated as training

ships. Trainees would receive a monthly monetary allowance of $25.00. There would be no post-training benefits. Dependency allowances would be payable to bona fide dependents of trainees.

Basic Training Periods

The Commission recommends that there be two consecutive basic training periods each year, one to start on 1 May and end on 31 October, and the second to start on 1 November and end on 30 April. They envisage the first period being attended largely by high school graduates who will go direct from school to training, including these who intend to go to college, or into occupations other than agriculture. It is believed that the second period would include primarily those young men not in school, or those going from school to agricultural pursuits. The Commission objected to the original plan of the War Department for quarterly inductions on 1 January, 1 April, 1 July, and 1 October, on the grounds that it would delay the college education of most trainees by one year, and would result in periods of idleness for others following graduation from high school, or following completion of the basic training phase.

The Commission felt that the type of training should be left to the operating service. However, they did emphasize their strong convictions concerning certain aspects of the training. Thus, for example, they felt that commando type training should be eliminated, that great emphasis should be given to the information program, that considerable duty time should be devoted to general education and instruction in citizenship. The Commission is apparently apprehensive that there will be too much leisure time, for they insist that the program be intensive and proceed on the hypothesis that most of the trainee's time must be considered duty time —that there must be no forty hour week— that the trainee's time should be fully occupied, and that many activities, normally considered by the Armed Forces to be off-duty activities, be incorporated in training schedules and thus made compulsory.

Discipline

As to the discipline of trainees during the basic training period, the Commission recommends that the code of conduct be based upon a recognition of the youth of the trainees, and the fact that the camp experience represents, in many cases, their first time away from home. Leadership and guidance is to be stressed rather than punishment. Where punishment is necessary to support proper discipline, minor misdemeanors are to be tried by military courts, and more serious cases by Federal, State, or Military Courts as the accused trainee may choose. Trainee courts which have worked so well in the Experimental Unit at Fort Knox are recommended for minor derelictions. In connection with discipline of trainees it is recommended that Federal legislation be enacted to make it a Federal offense to sell liquor or narcotics to trainees. Prostitution or procuring in connection with trainees, and assault of a trainee with a deadly weapon are also recommended Federal offenses.

Welfare

The Commission would charge the Armed Forces with the following responsibilities:

a. Correction of physical defects and improvement of health of trainees.

b. Exercise of care in assisting trainees to make emotional adjustment.

c. Reduction of illiteracy.

d. Furnishing of vocational guidance through testing.

e. Numerous specifically defined measures to protect the morals of the trainees, with great stress upon more chaplains and greater responsibilities for chaplains.

Options

Upon the completion of the basic training period of six months, the trainee

would be required to adopt one of the several optional methods of completing his obligation under Universal Training.

Pointing out that the trainee will then be well grounded in the fundamentals of a soldier's job and will continue to be so qualified, in diminishing degree, for a period of five years without further training, the Commission says that he would be qualified, as a result of this training, for home defense duties for an additional ten years. However, he would not be fully prepared for effective participation in a trained unit in war time, without a further period of individual and unit training following the basic period.

The options which are recommended by the Commission provide for the following:

a. Opportunity for specialist and officer training.

b. Unit training.

c. Maintaining the National Guard and Organized Reserve at full strength, with pre-trained men.

d. Creation of an adequate officer reserve.

The number of trainees adopting each option must be regulated by military requirements from time to time, but within these restrictions utmost freedom of choice must be allowed to the trainee. Obviously, the options must be so planned that they will not interfere with the trainee's freedom to choose his future place of residence, his education and his occupation. The several options must be substantially equal in the burdens they impose upon the trainee.

The options suggested by the Commission are:

a. Completely voluntary decision to continue camp or shipboard training for an additional six months in order to receive specialist, unit, and leadership training.

b. Enlist in one of the regular Armed Forces, before, during, or after completing basic training. This option too, is completely voluntary on the part of the trainee.

c. Entrance into the U.S. Military Academy, U.S. Naval Academy, U.S. Coast Guard Academy, U.S. Maritime Academy, or any accredited State Maritime Academy. The Commission recommends that no young man be entered in any of the Federal Government Service Academies until he has completed the basic training period under Universal Training.

Enlist in the National Guard for a specified period of enlistment.

Enlist in a unit of the Organized Reserve Corps for a specified period of enlistment.

Enlist in the Enlisted Reserve Corps and pursue a college ROTC course, with the agreement to accept a reserve commission if offered.

Enlist in the Enlisted Reserve Corps and enroll in a civilian trade school, vocational school, or college which offers training in the professions, arts, and skills having war-time military value.

For those who could not adopt one of the foregoing options (as for example, in the case of a man not going to college, whose home town has neither National Guard nor Reserve Units) there is a "catch-all" option requiring enlistment in the Enlisted Reserve Corps for six years, with provision for a maximum of one month's active duty training each year during that period.

In connection with the options involving education, the Commission recommends that scholarship or grants-in-aid be given to a number of selected trainees each year, predicated upon an agreement by the trainee so selected to serve a specified minimum period (two years suggested) on active duty with the Armed Forces, following his graduation from school or college.

Supervision of Options

The Secretary of National Defense would decide what options there should be,

and the quotas for each. The Universal Training Commission would establish policies and standards with respect to the manner of selection of options by trainees, such matters as transfers from one option to another, and matters relating to scholarships. The National Selective Training Office, operating through the local boards, would enforce and supervise the performance of options.

Initiation of Program

The Commission recommends that enabling legislation for Universal Training be enacted at once and that the program commence one year from the approval of the enabling legislation in order to permit adequate time to organize the supervisory agencies, and to enable the Armed Forces to perfect their plans and assemble a corps of specially screened officers and enlisted personnel as instructors and supervisors.

The Commission recommends that the enabling legislation authorize the continuance of the program for an initial period of ten years, but that at the end of the first five years of operation, a special commission be appointed by the President to review the world situation with a view to determining whether the continuance of Universal Training is necessary and desirable.

The deep concern with which the Commission apparently views the importance of the security program outlined in their report is expressed in one of its paragraphs:

"If the people of this country will declare in convincing fashion their determination to support such a program in all its elements for as long as may be necessary to guarantee the attainment of a stable world order through the United Nations, they will make the greatest contribution to perpetual peace within their power."

To which the thinking army officer can only add "Amen."

As insurance to our national defense, we must always have, therefore, a reservoir of trained young men; of citizens who are ready to take on the full responsibility of coming to the aid of their country whenever needed. The only way to achieve that end is to have universal military training.

Former Secretary of War Robert P. Patterson

Two Types of RIVER CROSSINGS

Lieutenant Colonel Evert S. Thomas, Jr., *Infantry*

The following article is one of the selected number of monographs prepared by officers attending the 1946-1947 class of the Command and General Staff College, which will appear in the MILITARY REVIEW from time to time.—The Editor.

THE "deliberate type of river crossing" is characterized by careful planning and preparation, and its success is directly proportional to the thoroughness of the planning and preparation. The hasty, aggressive type crossing is characteristic of the pursuit phase of an operation when the enemy is off balance, and a commander may be justified in taking unusual chances in order to achieve surprise and assure the success of his mission.

An example of the deliberate type of crossing was the action of the 34th Infantry Division in its crossing of the Volturno River on the night of 12-13 October 1943. The crossing of the Inn River by a battalion of the 71st Infantry Division in the spring of 1945 affords a good example of a hasty crossing. The former was made against an enemy as yet unbeaten, while the latter was carried out against an enemy that was beaten and was exerting its last efforts to delay the relentless pursuit by the Third U.S. Army.

The Volturno Crossing

As the German forces were forced to retreat from Salerno, they conducted an orderly withdrawal to the Volturno River, where it became evident that they intended to make a determined stand to secure time for the preparation of their winter line in the mountains.

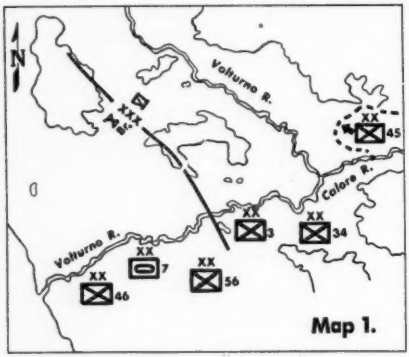
On 15 September, the Commanding General, 15th Army Group, instructed Fifth Army to cross the Volturno River and drive the enemy some thirty miles into the mountains. To carry out this mission, Fifth Army had at its disposal the VI U.S. Corps, composed of the 3d, 34th, and 45th Infantry Divisions, and the X British Corps made up of the 7th Armored Division and the 46th and 56th Infantry Divisions. The total strength of this force with supporting troops amounted to approximately 100,000 men.

Arrayed against this force was Marshal Kesselring's Tenth Army, consisting of the Herman Goering Division, the 3d and 5th Panzer Grenadier Divisions and elements of the 26th Panzer Division. This force was outnumbered by Fifth Army, but it had both weather and terrain on its side.

The western part of the Fifth Army zone was a broad level stretch of farm land fifteen to twenty miles wide, extending northwest along the coast for thirty miles from Naples to the Mount Massico Ridge line. This area was assigned to the X British Corps.

The VI Corps was assigned the area of mountains and valleys extending from the coastal plain to the Matese Range. This country varies from low hills, covered

with olive groves and terraced fields, to barren rocky crags that tower to a height of 6,000 feet. The mountains present a formidable barrier to the movement of troops and their supplies, and is strongly reinforced by the Volturno and Calore Rivers. The Volturno is not a large river, generally not over 100 yards wide. Except after severe storms, it can be waded in several places. Its real strength as an obstacle lies in the steep, almost verticle banks which are from fifteen to forty feet high. It rises in the mountains north of Venafro and pursues an erratic course southeast to its confluence with the Calore. Together these rivers form an almost continuous barrier about sixty miles long directly in the



Map 1.

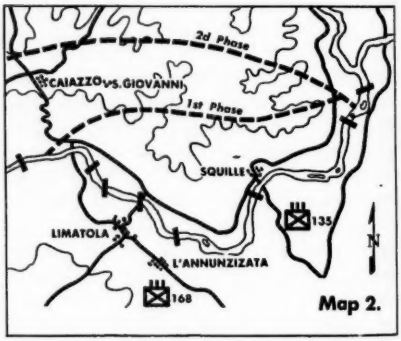
path of any advance on Rome from the south (Map 1).

The attack of Fifth Army was originally scheduled for the night of 9-10 October, but constant rain and mud had so slowed operations that it was postponed to the night of 12-13 October in order to allow X Corps and the 34th Infantry Division more time to prepare a coordinated attack across the Volturno, and to permit bringing forward sufficient bridging material.

By 12 October, VI Corps had reached the river all along the front. The 34th Division had relieved the 30th Infantry Regiment on the right of the 3d Division. The 45th Division had established a bridgehead across the Calore River and everything was set for the attack (Map 2).

Orders for the attack, issued 11 October, divided the 34th Division front of approximately eight miles between the 168th Infantry Regiment (which was to make the main effort on the left toward Caiazzo), and the 135th Infantry Regiment on the right.

The 133d Infantry was held in Division Reserve with one battalion ready to move whenever directed. The high ground north of the river precluded any use of tanks initially, so the 756th Tank Battalion was also held in reserve.



Map 2.

On the two nights preceding the attack, patrols were very active, and in spite of intense counter-reconnaissance measures by the enemy, patrols of the two assault regiments and the Division Engineers carried out aggressive probing of the enemy's defenses and made careful reconnaissance of the river for fording, ferrying, and bridging sites.

On the night of 10-11 October, a patrol from the 168th Infantry probed the area west of Limatola. They followed a tree-lined ditch to within fifteen feet of the river and three enlisted men waded out into the water. As they tried to cross, they were fired upon and forced to with-

draw. They reported that this was a good place for a ford but that it was well guarded. The following night, engineers accompanied a patrol to a spot about 600 yards downstream where assault boats could be used to carry infantry across the river.

During the day of 12 October, all men in the 1st and 2d Battalions, 168th Infantry were given dry-land training in the use of assault boats. Patrols of the 135th Infantry were also active and found fords in their zones. In most places the muddy banks and muddy bottom prevented the use of vehicles, although a spot was found near an old dam where waterproofed vehicles might cross.

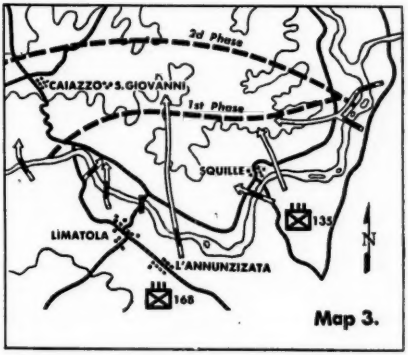
The plan for the 135th Infantry called for the 1st Battalion and Company E to cross and capture the high-ground back of the village of Squille. When this had been accomplished, the 2d Battalion was to pass through the 1st Battalion and continue the attack. After dark 12 October, the engineers joined the two assault regiments and moved with them to their final assembly areas.

At 0145 the Division Artillery, supported by the fire of the attached Tank Destroyer Battalion began the preparatory barrage. At 0200 the fire was shifted to prearranged targets and the infantry began their attack.

In the zone of the 168th Infantry, one company of the 1st Battalion, crossing by the ford as planned, ran into a minefield and suffered several casualties. The balance of the battalions started across in assault boats about 800 yards downstream. The first wave of this group made the crossing in good order, but the boats drifted so far downstream with the swift current that they could not be used for the next wave. The troops had no alternative but to wade across in shoulder-deep water (Map 3).

The 2d Battalion, in column of companies, started to cross the ford northeast of L'Annunzizata, but in the darkness the leading troops lost their way, and as a result the guide ropes were strung over water that was much deeper than anticipated. Some men were drowned and a large amount of equipment was lost. Because of this unforeseen delay, the battalion did not complete the crossing until 0640. Having reached the other side, the battalion pushed rapidly forward and by 0730 had reached its initial objective, the high ground east of San Giovanni.

The 1st Battalion did not meet with the same measure of success. Running into heavy fire, it was unable to advance beyond a point about 400 yards from the river until shortly after noon. At 1400, the battalion was ordered to continue the attack supported by the fire of the Division Artillery. Advancing closely behind this fire, the battalion fought its way up the hills, and by dark had reached its first objective, the high ground above San Giovanni. In this attack the battalion received unexpected assistance from Company "G" which had been directed to support it by fire. One platoon of Company "G" penetrated to the streets of San Giovanni, but as no one was aware of this uncoordinated effort they were caught in the fire of the supporting artillery and suffered some casualties. They did however,

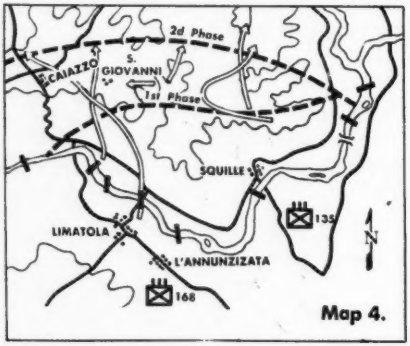


Map 3.

succeed in causing the enemy to withdraw sooner than he had planned.

Having secured the hills above San Giovanni, the 168th continued the attack against Caiazzo, the division objective. This was captured shortly after daylight, 14 October. The 1st Battalion pushed on to the north and the 2d Battalion moved northeast to protect the right flank of the regiment.

In the zone of the 135th Infantry, the 1st Battalion and Company "E," supported by the fire of the 125th Field Artillery Battalion, jumped off at 0200, and meeting practically no resistance initially, moved rapidly across the plowed fields



Map 4.

toward the objective. One company of the 1st Battalion was across the river and by 0220, the battalion had closed on the first phase line and was pushing toward the second. The enemy now began to put up a much stiffer resistance. His fire became more intense and his minefields more numerous. The 1st Battalion made little progress during the afternoon. The 2d Battalion, moving up after dark, had to fight through a pocket that had been bypassed earlier. As the day came to a close, the regiment had failed to reach the second phase line (Map 4).

Continuing the attack on the following morning, the 1st Battalion occupied Hill 283 at 0400 and brought up four tank destroyers that had managed to ford the river. These tank destroyers from the 776th Tank Destroyer Battalion supported the infantry from hull-down positions, and by the end of the morning, the area south of the second phase line had been cleared of the enemy. Contact was made with the 168th Infantry on the left and the 45th Infantry Division on the right.

Before the 34th Division could continue its advance, it was necessary that bridges be constructed to permit essential supplies and supporting weapons to be brought forward. This proved to be the toughest part of the battle.

On the morning of 13 October, Company A, 36th Combat Engineers, began moving the divisional bridging material to previously selected bridging sites north of L'Annunzizata. In an effort to speed up operations, the rubber floats were inflated prior to loading on trucks. This attempt to save time nearly proved disastrous, because the enemy guns opened fire and scored hits on several of the trucks. Shell fragments pierced many of the floats and damaged them beyond repair. The repairable floats were patched and the other material was repaired and carried to the river by way of an unimproved dirt road. The bridge was scarcely started when the enemy again opened fire, destroying more floats and equipment and causing heavy casualties among the engineers. Operations had to stop. During the afternoon, the equipment was pulled back to a concealed position and again repaired. In the evening, under cover of a smoke screen, another attempt was made to construct a bridge. No sooner had the smoke started than the enemy started shelling the area again and made work impossible.

In the meantime, a reconnaissance party had found another bridge site in a defiladed spot near Squille. This place presented more difficult technical problems than had the first site, because the river was wider and the banks and approaches

were more difficult to exploit. However, the advantage offered by the defilade outweighed all of the disadvantages, and the bridging equipment was moved to the new site. By borrowing floats from another unit, Company A was able to finish a workable bridge by 1030, 14 October, and shortly thereafter the approaches had been improved and the roads cleared of mines, assuring the 135th Infantry a supply route.

To supply the 168th Infantry, it was planned to construct a thirty ton ponton bridge at the old ferry site below Caiazzo. The enemy, by means of the artillery observers located on the high ground around Caiazzo, prevented Company B, 16th Armored Engineers, from starting work on this bridge until the afternoon of 14 October. Once started, the work went rapidly forward and the bridge was completed by the next morning.

With winning the fight to construct the bridges and get the supplies rolling across the river, the first battle of the Volturno was won, and the division took up the pursuit of the fleeing enemy.

Lessons

In the action just discussed, the 34th Division was confronted by very difficult problems of weather, terrain, and enemy. The success achieved was proportional to the care with which the action was planned.

Lives and equipment were lost due to the fact that after suitable crossing sites had been found, one unit neglected to provide a means by which the troops could find the correct crossing under cover of darkness and smoke during the excitement of battle. Guides or other means must be provided to assist troops in moving from their final assembly areas to proper crossing sites.

Much time was lost and a good deal of valuable equipment destroyed because of failure to pick a defiladed bridging site when one was available.

Artillery observation posts available to the enemy must be neutralized or captured, before successful bridging operations can be undertaken.

The aggressive patrolling prior to the attack paid off in several instances where battalions were able to make crossings practically unopposed. Patrolling prior to a river crossing should, therefore, be aggressively carried out in order to locate the enemy's defenses.

Coordination of plans down to company and platoon level is important. Because of the lack of coordination in the case of the penetration of San Giovanni by Company "G," 168th Infantry, our troops were killed by their own artillery and full advantage of their move could not be exploited.

The Inn Crossing

On the afternoon of 2 May 1945, the Commanding General, 71st Infantry Division, found that the only crossing over the Inn River, in the zone of his division, were two dams, one of which was located at Ering and the other at Obenberg, Austria. Since the leading elements of the division were still thirty-five to forty kilometers from the dams, it was apparent that some action must be taken without delay, or the division would be forced to make an assault crossing of the river when it was reached. The Commanding General immediately decided to attempt to seize the two dams intact, in the hope that at least one of them could be used to carry the division into Austria.

It was decided to motorize one battalion from the 66th Infantry and one battalion from the 5th Infantry and to make a headlong dash for the two dams, counting heavily on surprise and aggressive action to decide the issue in our favor.

The 1st Battalion, 66th Infantry, was ordered to capture the dam at Obenberg. In order to make the utmost speed and assure success, the Battalion Commander decided that rather than wait for sufficient vehicles to motorize his battalion, he would organize a small task force

consisting of one rifle company, an 81-mm mortar section, a tank destroyer platoon from the 635th Tank Destroyer Battalion, the Battalion Antitank Platoon (for direct fire missions, not for antitank purposes), a platoon of chemical mortars, and a heavy machine-gun platoon. The Regimental Intelligence and Reconnaissance Platoon was assigned as a reconnaissance and covering force. The balance of the battalion was placed under command of the Battalion Executive who was ordered to follow as soon as the battalion was motorized, and to go into an assembly area in the vicinity of Essfling, Germany. It would also clean up any enemy bypassed by the task force.

At about 1400, 2 May, the task force, after very careful briefing, moved out with orders not to stop short of the dam under any circumstances. Since the situation at the time was what is usually termed "fluid," it was felt that there was a good chance of running on through the enemy without stopping to fight. That is actually what happened.

After passing through the corps covering force, the task force ran into several groups of the enemy that were almost too surprised to react, and with the exception of one instance when the leader of the Intelligence and Reconnaissance Platoon halted his unit and engaged in a fire fight on foot, the task force rushed past these groups, firing only when absolutely necessary and then from their vehicles.

All enemy wire lines along the route of advance were out of order, so that when the leading elements of the task force arrived at the dam they found the bulk of the troops on the German side comfortably enjoying their evening meal. The arrival of the task force naturally alerted the Germans on the Austrian side of the river. In spite of heavy fire support from the Austrian side, the enemy troops on the near side of the dam were quickly subdued. An officer of the task force, in the meantime, had forced an engineer employed on the dam to lead him under the river into the tunnel, where he found approximately six tons of demolitions, placed to destroy the dam. He removed the detonating caps from the charges and the dam was saved. It was learned later that the enemy detailed to blow the dam had been killed by the first round from the tank destroyer.

The destruction of the dam having been prevented, the next step was to secure a bridgehead on the Austrian side. This was accomplished by sending the rifle company, under cover of a smoke screen and all available fire power, through the tunnel and out onto the Austrian approach. As the men cleared the tunnel and started up the dike, they became heavily engaged, and progress was very slow. In the meantime, the Battalion Executive arrived on the scene and was directed to send a force across the river by means of captured boats and barges to envelop the enemy right flank. As soon as this force appeared on the enemy flank all resistance collapsed, and by 2200 the bridgehead was firmly established.

During the night, the battalion was busily engaged gathering in units as large as companies that had been dispatched to the defense of the dam, totally unaware that it had already fallen. By morning, the prisoners taken outnumbered the battalion, the total being about 1,000. The battalion had to guard the prisoners as well as hold the perimeter of the dam until the arrival of the regiment the following day.

From this example we can learn that when speed is the essential ingredient for the success of an operation, the final decision must rest with bold commanders, willing to make decisions, and with aggressive troops that are willing and able to carry out the missions as called for by these decisions.

Five Basic Supply Jobs

(*Part I*)

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Space limitations require that this article be divided into two parts. Part II will appear in the January 1948 issue of the MILITARY REVIEW.—The Editor.

THIS article has for its purpose the presentation of some of the elementary overseas supply functions and principles with which junior officers, especially junior combat arm officers, should become familiar early in their careers, and which they might well use as a basis for further study if they are to acquire a professional background for a logistical war.

In World War II, as in previous wars, many line officers were selected out of their preferred combat arms and placed in responsible supply positions. Further, many of these officers found themselves in these supply positions after being commissioned only a few years and without having had the benefits of training in a higher staff school or of a detail in a technical service.

Our technical service officers study these subjects in their service schools, and in addition are constantly exposed to overseas supply organization and procedures. Line officers are accustomed to obtaining supplies from a depot or port without worrying too much about how the supplies happened to get there or whether or not special items or unusual quantities will be available when called for. When these officers are detailed to responsible command and staff positions where overseas logistical background is necessary, the technical services as well as the troops have every right to expect that they have at least a basic knowledge of supply procedure.

In some instances during World War II, these line officer staffs were eminently successful; in others they had difficulties and had to learn by sometimes bitter experience. One line staff in which not only the G-4 but the G-3 members had had considerable supply training established requirements early in 1942 for specialized equipment and critical items which would be needed in 1943. On the other hand, another staff forgot to consider important special items; in one instance, waterproofing equipment, which thus delayed an amphibious campaign until it could be procured in the zone of the interior and shipped to the theater. One particular staff worried chiefly about a saluting gun with which to pay honors to possible visiting dignitaries.

The specific objectives in this discussion of the elementary supply jobs are:

First: To develop the five main jobs which must be accomplished in the supply organization in an overseas theater or base, and to show some of the basic command and staff responsibilities in such an organization.

Second: To present some of the time factors involved in setting up an organization to accomplish these jobs.

Third: To analyze some of the time factors in accomplishing supply of an overseas command.

Chart I shows the supply group organization currently used by the War Department. It is admirably suited to a discussion of supply functions at any level since it clearly separates the basic supply jobs. This chart, however, shows but *one* method or plan for setting up a supply organization. No two overseas commands, or technical services will have similar organizations. At times it may be feasible to combine requirements, procurements and distribution into one section or branch. Many services habitually organize on a commodity basis. Occasionally the pressure of equipping newly activated or newly arrived troop units may be so great that an entire branch must be organized for the task. In general, however, whatever the form of the over-all organization, personnel working with requirements will perform the duties shown under requirements on the chart; personnel working with procurement will perform the duties shown under procurement on the chart, etc. It is not probable that supply from a zone of interior airhead to a theater airhead, rather than from port to port, will change the basic functions although time factors and levels may change.

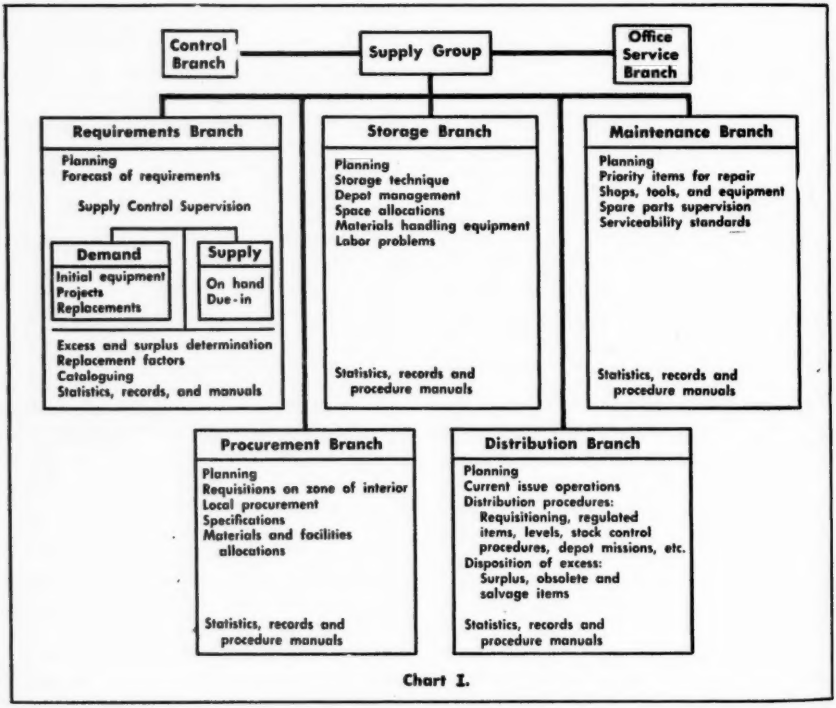

Chart I.

In large forces the supply groups will be found within the G-4 division of communications zone and section headquarters, and within the headquarters of the technical services in communications zone and section headquarters. In a smaller task force or base command, a smaller but similar organization would be necessary in the Army Service Command or correspond-

ing supporting unit. Each group or branch works with a paralleling group or branch in the next lower or higher echelon. The ordnance storage branch in a communications zone headquarters, for example, would work closely with the G-4 storage branch and with the storage branches in the communications zone sections. Formal directives would of course pass through proper command channels.

Main Supply Jobs

In any organization, the supply tasks can be placed under the following headings:

(1) Determination of *requirements* and supply control.

(2) *Procurement* or requisitions.

(3) *Storage.*

(4) *Distribution,* including issues, redistribution or final disposal.

(5) *Maintenance* or repair for return to user or to stock.

The supply officer of an infantry regiment which is outfitting in a rear area determines his *requirements* from his Tables or Organization and Equipment or Tables of Equipment 21. Knowing what the regiment has on hand, what is being returned from repair shops, and what he expects from previous requisitions he can compute his shortages. He then initiates *procurement* action by submitting requisitions. When the items are turned over to him by the higher unit supply officers he *stores* them temporarily until he can make *distribution.* He is also responsible for sesuring *maintenance* services from division shops and for supervision of the issue of repair parts within the regiment. In performing his job he must know the plans of the commander and he must, from a staff viewpoint, supervise supply throughout the regiment.

In a division or army the tasks remain the same. The G-4, however, leans more heavily on his technical services while he tries to find out what the planners are concocting. He issues supply directives to parallel the proposed plans and exercises staff supervision. He becomes more dependent on accurate reports from the services and from the troops. It should be noted that the personnel concerned with supply in the divisions and in the army is largely provided in Tables of Organization and Equipment, and that with our new six army organization in the zone of interior, this supply personnel will receive considerable training.

In an overseas command, the tasks remain the same except that the volume of business to be handled is increased, and supply operations are projected far into the future. Here the supply staffs must be especially energetic in obtaining the latest plans for operations and in seeing that these plans are speedily converted into clearcut directives for the operating groups in technical services. The commanders and staffs in communications zone headquarters, in the technical services and in the sections must lean still more heavily upon the operating groups, yet they must insure coordinated action and uniform practices. Accurate reports and forecasts become still more important; it is impossible to run a billion dollar business with your command post in your hat. There must be reports showing how the requirements are being met and how they will be met. Incipient shortages or excesses must be flagged by more or less automatic procedures. It might be well to note that there are no standard Tables of Organization and Equipment for an overseas supply organization, and while you can do a fair job of training an infantry division, or even an army, in supply procedures in the zone of interior, there is only one place you can shake down an overseas supply organization, and that is in the theater of operations.

Functions of the Requirements and Supply Control Branch

The principal function of the requirements and supply control branches is to

forecast *demand* or the quantity of each item which will be needed by the command as a whole during future periods of operation. The sum of the needs of our various theaters almost completely determines the load which is to be put on the civil economy, on transportation, and on natural resources. The more accurately all theaters can compute their needs, or furnish estimates of operations, and the further into the future they can make forecasts, the better will they be supplied. If they overestimate on one type of supplies they are very likely to be shorted automatically on another type. Industry has its production limits. In the last war there was never a time when we were not short many critical supplies.

The basic data needed for the computation of requirements or demand are:

(a) An accurate troop basis forecast, or

(b) An accurate statement of future troop deployment.

(c) A list of approved projects.

(d) A file of authorized allowances such as Tables of Organization and Equipment, special lists of equipment, Tables of Equipment, and SNLs (Standard Nomenclature Lists) or other service publications.

(e) Replacement factor and consumption rate data.

(f) Statement of authorized levels.

(g) General information as to proposed operations or directives which indicate when critical supply jobs will arise.

(h) Needs of the Navy, Allies or other demands not included in projects.

In any major operations this data must be projected into the future a year or more.

The computations are going to be made by experts and analysts in the technical services. The requirements branch in G-4 of the overseas headquarters must see that this basic data is supplied to the technical services, and the service chiefs must see that the information is passed down to the computers. Advanced sections are responsible that any unusual future demands of the armies are promptly relayed to the G-4 division at communications zone headquarters.

Troop bases and proposed deployment data for future operations are especially important. In the European Theater of Operations (ETO), troop data were not available to the technical services until very late in the invasion planning phase. The services were concerned primarily with day to day supply of existing forces, although some invasion plans were available to communications zone planners. Even the data which the planners possessed were apparently not well coordinated. It was not difficult for officers to obtain several theater troop forecasts. Under such conditions plans were often submitted by the technical service (planners) with a basic assumption: "Troops to be supported. . . . varying with the plan itself."

Projects are normally initiated by the theater planners. Some may have been initiated within the War Department based on prior knowledge of the proposed operations. If the bills of material are complete they may be converted directly to requirements. Frequently it is preferable to furnish the zone of interior with general information concerning the proposed project, and to have the detailed bills of materials prepared within the War Department. In any case, the requirements should be included in the supply control studies for the items involved, so that the over-all needs of the theater can be represented. For example, if extra rifles and radios are included in an operational project, as replacements for those estimated as probable losses in an amphibious operation, the approved quantities must be presented to the technical services along with a statement as to when and where they are to be supplied.

The computation of requirements, using the factors in the preceding paragraphs, must be made on an item basis. You can-

not requisition or issue tons. The armored divisions require vastly different supplies from those required by the infantry divisions; a three hundred mile pole line project calls for a fairly specific bill of materials.

The computations are not limited to the needs of the next thirty to sixty days at communications zone G-4 and technical service level. Theaters are required to forecast their needs at least a year ahead. They need not submit requisitions much more than ninety to 120 days ahead, but they must make the best possible estimates of their needs four or five quarters ahead so that procurement in the zone of the interior can have the articles available when the requisitions are received. These quarterly forecasts are improved during each succeeding quarter. The heavy artillery ammunition program in World War II illustrates the need for such forecasting. Late in 1944, and early in 1945, requisitions, not supported by a forecast, poured into the War Department. It was necessary to implement a billion dollar heavy ammunition program which it was estimated would require one year for completion. The war ended before it produced.

The requirements branches in the technical services are logically charged with the preparation of the supply control forms. A separate agency might be established which would collect demand data from the requirements branch, data on repaired items from the maintenance branch, production or procurement data from the procurement branch, and on-hand data from the distribution branch. This would involve setting up a separate group of statisticians duplicating those already familiar with the needs of the command. To avoid this duplication, the requirements branch is the coordinating agency for the other branches mentioned. The other branches are normally charged with submitting, or supervising the submission of, accurate data pertaining to their operations to the requirements branch. The requirements branch is then charged with reviewing the data and with initiating appropriate action if there are any incipient shortages or excesses. General supervision is a responsibility of the requirements branch in G-4 of communications zone or base headquarters.

Although the requirements branch in G-4 of communications zone or base headquarters is responsible for supervising over-all supply control procedure, it is not reasonable to expect that the detailed supervision will extend to all of the 800,000 odd items supplied by the technical services. The G-4 branch is, however, expected to scan critically the 2,000 to 2,500 major items. These represent the bulk of the tonnage and about eighty per cent of the money value of all supplies. Their control will permit adjustments of tonnage allocations if shipping is short, as well as provide basic information of the over-all supply picture. In general, the technical services are held entirely responsible for controlling the minor items, with only occasional spot checks by G-4 requirements branches.

In actual practice it has not been possible for any overseas command to compute its requirements during the first months of its existence. It is too much to expect any base or communications zone to produce estimates for its immediate needs, much less its future needs, at the same time that it is looking for housing or other facilities and while it is trying to perfect its organization. Almost without exception, the Chiefs of Technical Services in the War Department have computed requirements for initial maintenance, have shipped the articles to the ports automatically, and have then followed with further automatic maintenance shipments until the overseas command indicated its ability to process requisitions.

The fact that the zone of interior can make automatic shipments does not lessen the desirability of obtaining a firm state-

ment of requirements within the overseas command at the earliest possible moment. Automatic supply is rarely satisfactory, for it is based on factors not applicable in the theater, and without exception, results in unbalanced supply. Also, no one should know as urgently as the theater staff what is on hand, what is needed, and what the shortages are.

The determination (not the declaration) of surpluses is a requirements branch job. In the supply control operation, the communications zone G-4 requirements branch is responsible for furnishing the technical services with the rules for the computation of the disposal level. The statisticians in the technical services compute the excesses and make appropriate entries in the supply control forms. The actual declaration of surpluses, or disposal of excesses, is a distribution job, since it would be poor procedure to have one agency directing the issue of a particular group of items at the same time that another agency was declaring the same items surplus.

Replacement factors and consumption rates may seem relatively unimportant at the start of a war, or during the first months in a theater when initial equipment poses the major problem, and when equipment issued to troops is still new. However, it should be remembered that the supply job after the first few months of an operation is largely a replacement job, and that procurement is based on the factors on hand or those improved factors turned in from the theaters. Requirements branches are responsible that experience data is gathered as soon as possible so that transition from initial issues to replacement issues can be accomplished smoothly. This job was not fully appreciated within the theaters initially in World War II. In fact it was necessary for the War Department to send special teams to various theaters to study replacement factor, if industry was to be given its proper lead time for procurement and a reasonable assurance of some uniformity in production schedules.

Cataloguing is concerned primarily with prescribing uniform nomenclature and parts numbers. Items received from the zone of interior are already labelled, all too imperfectly. There is little the requirements branches in a theater can do about changing the names of these articles, but they can be effective in preventing a locally procured "30-inch pinch-bar" being called a "crowbar" by one service, a "pry-bar" by another and a "widget, 30-in, hexagonal steel," by a third service. This problem has never been solved even in the zone of interior, and there are numerous cases where one service was surplusing an item while another was buying or denying supply of the same or identical item.

The functions of the requirements agencies can then be summarized as:

(a) Furnishing the computers with essential data to permit them to establish requirements or demands.

(b) Producing supply control data and indicating the action desirable to keep supply and demand in balance.

(c) The determination of excesses and surpluses.

(d) The establishment of replacement factors and consumption rates for the theater or other command.

(e) The perfection of cataloguing to insure uniform nomenclature and identification numbers.

Military Psychology — Factors in Human Development

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This is the first of a series of articles on Military Psychology. Subsequent articles covering the following subjects will appear in the MILITARY REVIEW:

*"Why Commanders Should Know about Motivation and Frustration"**
"Individual Differences"
"Analysis of Mental Ability"
*"Emotions"**
*"Soldier Adjustment"**

The articles (*) will be prepared by Chaplain (Major) A. C. Longley.—The Author.

Purpose

NOT without reason, the question might be asked: "what is the purpose behind including the study of psychology in a military school such as the Command and General Staff College? The question can be answered by asking another: What is psychology? Simply defined, it is the study of the behavior of individuals. From this premise, a clear-cut purpose can be established: To provide the military commander with a basic knowledge of human behavior which will assist him in evaluating, training, and controlling himself and others. The study of psychology is a quite logical basis for the study of leadership and the management of men. The management of personnel, military or civilian, is a science, employing scientific principles and demanding the research and intelligent thinking required of any of the traditional sciences. Understanding something of the physiological and psychological factors which result in behavior will form the foundation for a practical knowledge of the techniques which are most effective in understanding and managing men.

In a restricted sense, the psychology taught at the Command and General Staff College is "military psychology." Military psychology differs from other fields of psychology only to the extent to which it can be of practical application to the military commander. In this respect, it is more nearly like "applied psychology." The combat leader who has studied psychology as a science, who has acquired a knowledge of the psychology of individual differences, can better understand the impact that battle has on men. When, within the sound of artillery fire, he greets one hundred replacements fresh from the zone of interior, he realizes that he has not received one hundred uniformly trained, stable, combat effectives; on the contrary, he is faced with the grim knowledge that a higher kind of leadership and personnel management is demanded of him than could possibly be required of an industrial leader in the most critical labor situation. With infinite skill and understanding he must integrate these replacements into his command and lead them into hazardous duty.

Physiological Factors

Before an analysis can be made of the more complex behavior patterns which result from the needs of the individual,

a discussion of the physiological factors which affect human behavior should be considered. In a brief *resumé* of the subject such as this, it is not practicable to go into a detailed analysis of the functions of various organs of the body and the nervous system. Such knowledge, however, would give the student a basis for a more complete understanding of human development.

The human personality, which is manifested by the individual's behavior, is the result of years of growth and is influenced by the way in which the individual has grown. Not only will physical development affect his total personality, but also the social and economic influences to which the individual is exposed.

a. The Nervous System.—The development (or maturation) of the nervous system begins before a child is born. Even in the fetus, the nervous system is responsible for certain behavior activities. Long before the child has reached a state of maturation where he consciously dictates his responses to the world about him, his nervous system directs his responses, so that ultimately they become a part of his personality. It is a highly complex mechanism and its importance demands serious study. Physiologists have divided the nervous system into three parts: the central, the peripheral, and the autonomic system. The central nervous system comprises the spinal cord and brain. It is the "master mind" of the body, guiding and unifying its various parts into a team. The peripheral system is a mass of nerve fibers which transmit nervous energy to and from the central system and which connect with other parts of the body. The autonomic system controls the "vegetative processes" of the body: breathing, digestion, elimination, and its emotional responses. In a large measure, its functions are automatic, unconscious, and beyond control of the individual. The autonomic nervous system has been further divided into two main "divisions," the "sympathetic" and the "para-sympathetic." The former, situated in the trunk of the body, goes into action in an emergency, producing all the results achieved by adrenalin [see par. *b* (4)], but lasting for shorter periods of time. The parasympathetic carries on the daily routine of living.

The physiology of the nerve cells is of secondary importance to this discussion. Of more importance to the psychology of human behavior is the effect on behavior that the total nervous system exerts. Individuals differ in their reactions to various stimuli. They may not differ in the kind of reaction, but the degree of response will vary widely. For example, one soldier in an antiaircraft battery will spot the target precious moments before another; some men see far better at night than others; extensive laboratory experiments in reflex behavior, finger dexterity, and other tests of physical and mental quickness of response have provided extensive knowledge of the reactions of humans. Brain injuries during the war disclosed that certain areas of the brain are responsible for certain kinds of behavior.

Knowledge of the nervous system has provided evidence that while men may react in the same ways to outward stimuli, the rate of reaction will vary widely. Training will improve the reaction time of an individual, but the rate of progress will not be uniform in all. Disease and injury will seriously impair the functions of the nervous system; a heritage of low mentality and poor physical endowment will handicap the individual soldier greatly. Modern medical science can do little to change the physiological equipment of humans insofar as the nervous system is concerned.

b. The Endocrine Glands.—Scattered throughout the body are various glands which affect, and are affected by, the

behavior of the individual. Body tension induced by fear, hate, anger, and other emotional states which result in marked behavior patterns are induced, controlled, or absent depending on the presence and extent of the secretion of these glands into the blood stream. It takes about fifteen seconds for a chemical substance delivered into the blood stream by one organ to reach all the other organs in the body. (Thus, it can be seen that the circulatory system is as important an integrator of the total organism as the nervous system.)

These chemical substances are produced by glands, called "endocrine glands." These are glands of internal secretion, delivering their product directly into the blood stream. They produce one or more "hormones" which increase or decrease the activity of certain other organs, which in turn, markedly affect the behavior of the body.

(1) *The Pancreas.*—It is hard to believe that, in an individual who outwardly appears to be fit, a small unimportant object, just to the rear of the stomach, called the pancreas could raise havoc with his behavior. The pancreas produces two secretions, namely; (a) pancreatic juice, which is not strictly an internal secretion and which passes into the intestines where it acts on the food and aids in digestion, and (b) insulin which is much more important in terms of its effects. This hormone, carried by the blood, is an internal secretion and enables the muscles, the nervous system and the brain, to oxidize sugar (glucose), which is the fuel the body must have. If insufficient insulin is produced, diabetes results; varying amounts of insulin cause wide variations in the individual's activity and feelings. An excess in the blood causes him to feel hungry, excessively tired, tense and worried; larger amounts produce severe mental distress and eventually delirium and unconsciousness. A deficient amount of insulin likewise seriously impairs mental functions.

(2) *The Thyroid.*—This gland, located at the base of the neck in front of the windpipe, isn't much larger than the pancreas, weighing less than an ounce. A goiter results when it becomes enlarged. Lack of thyroxin, the thyroid hormone, causes the individual to lose his energy and makes him dull and sluggish; brain muscles become inert and the individual is slow, stupid, forgets as quickly as he learns, and is unable to concentrate. If the gland is missing or becomes diseased at birth, serious consequences result. Growth is stunted and mental development is greatly retarded. One of the remarkable discoveries in endocrinology was the cure for loss of thyroxin in adults by the use of sheep's thyroid extract. It does not, of course, restore the thyroid gland, but as long as treatment is maintained the individual is normal.

When the thyroid gland is overactive the individual is in a highly nervous state; he is restless and irritable, emotionally unstable and worries incessantly. The primary job of thyroxin is to speed up metabolism, or the chemical activity of the body; it aids or regulates the oxidation of sugar, for example, which insulin has made available. Thus, it is apparent that a soldier with a low basal metabolism will suffer from lack of interest, energy and inability to withstand the rigors of combat; conversely, a high metabolic rate will make him a doubtful effective in battle. The significant point with regard to behavior is that variations within these extremes, while perhaps not sufficient to warrant hospitalization can cause unpredictable and troublesome personality disturbances.

(3) *The Parathyroids.*—Located around the thyroid gland are four small bud-like glands about the size of peas. They are functionally distinct from the thyroid and operate to control the calcium in the blood

and hence the development of teeth and bones. Loss of the parathyroids is often fatal. In a deficiency of the hormone the individual is irritable and depressed, given to cyclic conditions of depression and maniacal excitement; muscular spasms are frequent. Injections of parathyroid extract have been remarkably helpful in improving the disposition and emotional stability of the deficient individual.

(4) *The Adrenal Glands.*—Over each kidney is a gland, called the adrenal. It is divided into two parts: the cortex (bark); and the medulla (pith). Oddly enough, each part differs from the other, and in effect, is an endocrine gland within itself. The medulla produces adrenin and the cortex produces cortin. Deficiency of cortin can be fatal; the individual suffers from insomnia; he becomes progressively weak, his basal metabolism is low and he has poor resistance to infectious diseases. Men who suffer from this lack of sufficient amounts of cortin cannot stand extreme cold or heat; their judgment is impaired and they become irrational. However, all of these symptons can be improved and even removed by administration of cortin extract. Adrenin (or adrenalin) is a powerful hormone capable of producing marked changes in the body. Excessive amounts in the blood result in the following bodily changes: (a) The liver is stimulated to release stored sugar; (b) Muscle fatigue is alleviated; (c) The rate of coagulation of the blood is increased; (d) Blood pressure is raised, forcing blood to the brain and muscles, rather than viscera or skin; (e) The heartbeat is increased and made stronger; (f) Vision is sharpened (pupil dilated); (g) Body elimination is suspended; (h) Air passages to the lungs are widened.

Not all of these physiological changes are produced solely by adrenalin; at least several seconds are required before adrenalin gets into the blood stream and brings them about. The "sympathetic division" of the autonomic nervous system also produces these results instantaneously and for a shorter period of time than adrenalin. Coagulation of the blood through the proper functioning of the adrenal gland, or a well-balanced autonomic nervous system capable of assuming its share of responsibility, has saved the lives of countless men in battle. All of these physiological changes heighten the body's effectiveness in a position of danger.

(5) *The Gonads.*—These are the sex glands and secrete hormones which have important effects on the individual's growth and behavior. At puberty, these glands are responsible for the development of secondary sex characteristics such as the mammary glands of women and the beard and deep voice of men. An excess of male hormones produces strong masculine characteristics, while an excess of female hormones results in femininity.

(6) *The Pituitary Gland.*—The pituitary is often called the master gland, because it appears to control the secretion of the other endocrine glands. It, like the adrenal gland, secretes two principal extracts (and several minor hormones), one from the anterior and one from the posterior lobe. The former supplies hormones that affect the thyroid, the gonads, the adrenal cortex and other glands. The anterior pituitary exerts considerable influence on bodily growth. It is responsible for dwarfism and giantism. Excessive amounts cause acromegaly, or thickening of the skull, in which the chin, nose, eyes, etc., become quite prominent. The dwarfs are quite different from cretins, being of normal intelligence and appearance. Disturbances of pituitary function are largely responsible for the problem behavior of children. The pituitary gland has a significant role in the development of personality; imbalance of its secretion often results in vagrancy, poor discipline, unwillingness to conform, moodiness, and bullying.

c. Endocrine Balance.—It can be seen that the endocrine glands exert a powerful influence on the body as well as on the individual's personality. In attempting to understand the effects of the endocrine system on human behavior, it should be emphasized that all of the glands are important. Their interaction with each other, somewhat like the antagonism between the nervous systems, results in bodily changes. For example, a moderate amount of overactivity of the pituitary makes an individual muscular, physically aggressive and emotionally stable, whereas underactivity results in poor physical condition, apathy, lack of drive or force, and a tendency to give up easily. An excess or deficiency of pituitary hormones alone can cause these physical states; but they may also be caused by lack of proper balance of all the hormones from the other glands. The individual's reaction to the critical opinions of others will complicate his condition. The soldier who is sluggish and is criticized or disciplined may develop a condition or behavior pattern much more serious than that caused by thyroid deficiency alone. Improper sex development or insufficient secretion of sex hormone may be responsible for the soldier's seeking some abnormal or subversive form of sex behavior. Primarily, the problem of endocrine balance is a medical one; but a knowledge of glandular function and the startling behavior patterns produced by the various hormones will enable the unit commander to understand better the complexity of human behavior; he will be slow to attribute to a soldier cowardice, unreasoning fear, stupidity, or other undesirable "traits of character" which may have their origin in physiological conditions over which his subordinate has no control, but which may be successfully treated to produce a competent member of his command.

Sociological Factors

The influence of external forces on human development can be extended much further, if less precisely, by considering the effects of society on the individual. Without any wish to inject a discussion of "heredity versus environment" and the extent to which they modify human development, it can be established beyond question that environmental influences are as potent in controlling personality development as any drug or hormone, and are as difficult to deal with. Indeed, medical treatment alone can be ineffective in correcting twisted personalities having their origin in a society which has denied them satisfaction of their inner drives or thwarted them in seeking a goal, or which has coddled and protected them from harsh reality.

The student of psychology in his study of human development would have a much easier time of it if he could establish with certainty which factors are responsible for the development of the organism. Unfortunately, human nature and its reactions to experimental situations isn't always predictable. There are too many variables involved, and few, if any, are likely to remain constant. Nor is this degree of unpredictableness confined to either sex.

Overactivity of the sympathetic nervous system, when there is no likelihood of danger and the individual is yielding to nameless fears, is responsible for many disorders that afflict man. The chronic worrier, the psychasthenic, worries himself into a case of stomach ulcers. If he worries long and hard enough, he may develop into a neurasthenic, a real psychoneurotic. He is lost as a combat effective and if his condition is severe enough, he is likely to end up in a hospital. These physical reactions are not developed intentionally; the victim is totally unaware of any overactivity of the sympathetic nervous system. He is as sick as the soldier who has been

wounded; and his recovery can be a long, drawn-out affair.

The basis for these behavior patterns, personality quirks and ill-defined disorders of mind and body cannot be found solely in the nervous system or the endocrine glands. Most individuals have a normal endocrine balance. Most of them have also inherited a nervous system capable of functioning under the stress of modern living. It is apparent, therefore, that the dynamics involved in human development invite consideration in another dimension.

The sociological influences, or the day-to-day environment in which the individual finds himself, are soon manifested in the attitudes, prejudices, and fears he acquires in his relations with those about him. Such a concept goes beyond the behaviorism concept of Watson who reduced the individual's adjustment to society to a matter of three or four reaction tendencies or "emotional reflexes" which subsequently became the complex personality structure of the individual.

The citizen soldier brings with him into the Army varying attitudes of mind which strongly affect his ability to adjust himself to military service. These attitudes have been acquired over the years and are of relative permanence, depending on the soldier's interests and how well he has been motivated. With the acquisition of each new attitude, prejudice, or fear, the behavior pattern of the soldier is changed with a corresponding change in his personality. At all ages, the human mind is extremely vulnerable to conditioning. Polls of opinion taken before and after viewing a motion picture skillfully presenting in a favorable light an apparently undesirable social group, a political candidate, or a little-known section of the country, often show a dramatic reversal of public opinion.

The more deep-seated or fixed the individual's beliefs and attitudes, the more difficult it is to alter them. The sage who observed that: "a wise man changes his mind, a fool never does" was more of a psychologist than he may have realized.

How is this process of conditioning reflected in a recruit? If he is introduced to army life, especially in time of war, with unnecessary emphasis on its severity and high "occupational hazard," he is immediately conditioned in such a way as to make him a doubtful potential. Such conditioning must be a gradual affair; after the first few weeks, he is much better prepared to learn the techniques of combat and the probable results of inadequate training.

From these generalizations it is possible to hypothesize several important factors in human development:

a. The rate of maturation controls the individual's mental as well as physical development.

b. Maturation in turn is influenced not only by hereditary factors, but also by environmental factors.

c. Maturation is evidently a continuing process; physiological changes occur as long as the individual lives; psychologically, the individual is also in a constant state of change.

d. Experimental results and the experience obtained during the war years has established the fact that attitudes, fixed beliefs, fears, prejudices, and even the inner drives of men can be altered.

Conditioning begins even before the infant takes his first feeding. The excitation of an interest, need, or goal builds up in the individual an emotional reaction which is readily transformed into a habit. How quickly the individual responds to the stimuli of his surroundings is controlled by how quickly he matures. Everyone does not mature uniformly; children born in the same year will not manifest all of the characteristics of adults at the same time. The maturation that is effective in producing two outwardly similar physical

specimens does not extend to a similar comparison between their mental development, behavior patterns, or personality traits.

Somewhere, during the growth from childhood to manhood of two such individuals, strong external influences have molded their thinking processes, formulated their beliefs, and provided the basis for their respective outlooks on life. Attachments to schools, political parties, geographical locations, and other more subtle sentiments, combine to create in each individual that hard-to-define quality called character.

It is the modification and interaction of these drives and attitudes which so often result in conflicts. Consider the young soldier in a foxhole for the first time, who has been subjected to constant strife in his homelife, to inadequate social and educational privileges, having no particular goals or ideals of his own. It is not surprising that his sense of insecurity will carry over to his present situation and render him completely unable to cope with it.

On the other hand, the soldier who has had the advantages of a normal life, who has always been a stable, well-balanced individual with diverse interests and a healthy attitude towards the world is better able to adjust himself, with proper leadership and strong motivation, to the rigors of war. This sort of individual resolves frustrations into other forms of satisfaction. He will be fearful of combat, which is normal, but he will be able to resolve his fear through an intelligent appraisal of the situation. His ability to do this does not rest solely on the training, motivation and leadership the army has provided; rather it had its beginnings with the conditioning he received from early childhood and the manner in which he responded to the environmental stimuli about him. This does not mean, naturally, that educational and social privileges will make of any soldier a Sergeant York. The relationship between intelligence, or lack of it, and emotional stability is apparently not high, but it is equally obvious that the influences which have surrounded the soldier in the normal American home are more conducive to emotional maturity than those in a home or society where standards of conduct, discipline, and a sense of individual responsibility are absent.

It has long been a matter of controversy as to what "instincts" or "drives" are present in a human being before he has had any opportunity to acquire learned responses. Certain instinctual behaviorisms are born in the organism, and it is essential that they be considered as potential effectors in molding the individual's personality. These instinctual qualities are inherited, just as the nervous system or the endocrine system is inherited. It is evident that they are subject to certain limitations in the extent to which they can be modified, removed, or developed, just as certain physical aspects of the body can be modified, within limits.

An instinct is defined as a "natural or unlearned activity." These organic needs are not only present at birth, but undoubtedly persist throughout life, being modified in various ways from the individual's experience. Apparently, the unlearned activity or trend remains little changed but the individual's behavior changes a great deal as the result of learning. It can be readily seen, then, that the ability of the individual to change his behavior as the result of conditioning or learning is in direct proportion to the extent in which the drive is present and the degree of motivation exerted. The soldier who is "over-sexed" may have difficulty in controlling his desires to satisfy this drive. It would be unwise to tamper with the appropriate endocrine glands in an effort to modify this activity. If he suppresses the desire he is much less likely to suffer any

serious consequences. Properly motivated, he can sublimate or substitute through a desirable outlet for this unsatisfied desire. However, if he should repress the desire (that is, completely forget it) then it becomes a part of the unconscious activity of his thinking and emotional life. Repression, however, does not remove the activity; on the contrary, the individual is quite apt to manifest the unpleasant or rejected incident in bizarre or neurotic symptoms.

Psychologists use the term "mental catharsis" to describe the means by which an individual can rid himself of some deeply disturbing emotional experience which comes to the surface as an objectionable personality trait or which causes the victim to overcompensate in some other direction. Mental catharsis is nothing more than a process of bringing out into the open the reason for the disturbance; the individual, in the hands of an experienced psychiatrist or psychologist, unburdens himself by talking about his fears, his prejudices, or his emotional difficulty. The military commander who takes the time to let a subordinate tell him his troubles is accomplishing the same thing. The smoldering "gripe" of one soldier can burst into a flame that will arouse a whole organization.

The American soldier is a citizen-soldier; he is a mercurial, self-reliant individual. Coming from every state in the nation, he is exposed daily to the vast and constantly changing panorama that makes him individualistic. On every hand, he is beset with a variety of stimuli which influence his attitudes, beliefs, and predilections. The press, the radio, the movie, and the combined activities of his home and community life play their part in shaping and reshaping his composite personality. With each new exposure, with each added interest, he modifies his behavior in some degree. Military service was a tremendous force in the lives of millions of men and women. The experience of a particularly violent battle can alter a soldier's mental life completely. It can uproot what was once believed the ineradicable influence of his early homelife and upbringing; so for that matter will any vividly traumatic or shocking experience. He falls into no definite pattern; there is no rule of thumb of leadership or personnel management which can be applied indiscriminately. For as many men as are in an organization, there will be just as many problems in leadership and management. To himself, he is the most important individual in the world. The wise commander understands this.

Psychology was defined earlier as the study of the behavior of individuals. Through this study it is to be hoped that the military commander will be better able to evaluate, train, and control, not only himself, but others. Despite the critical comment of the uninformed, the Army performed a truly remarkable job in dealing with the personnel problems of over twelve million men and women. No one in the army today gainsays the fact that the job could not have been done better; that it is exerting every effort to do so is a matter of record. The intensive research of specialists is constantly directed towards such things as psychological warfare, combat fatigue, rehabilitation centers, morale, training and education, and so on. The knowledge gained from the experiences of the last war and from future research should become a part of the knowledge and training of every military commander in the army. Such knowledge is power; it is the source of a commander's success as a leader.

MILITARY NOTES AROUND THE WORLD

BRAZIL

Military Service

The Brazilian Army was recently reorganized in accordance with the experiences of World War II and this included the Military Selective Service.

Service will commence at eighteen years of age. Every class (citizens born in the same year and eligible for military service) takes a physical examination six months prior to induction.

The military year, in principle, will correspond to the calendar year.

With respect to military service, Brazilian municipalities fall into three categories: (a) those furnishing recruits to troop units; (b) those having centers for Civilian Training; (c) those exempt.

There are 281 municipalities that furnish recruits to troop units; they are the ones adjacent to the unit centers.

Two hundred and fifty-four other municipalities of the interior, with sufficient population, furnish recruits to receive training as second class reserves in the centers for Civilian Military Training. Only those living in the urban and suburban zones are enrolled in these centers.

In the interior, there are 1,134 municipalities exempt from military service; they are rural municipalities devoted to cattle raising and agriculture. The exodus from the rural districts was enormous during the last war and industry absorbed numerous farmhands. In order to counteract this the government exempted these municipalities from military service.

In brief, only a population of fifteen million will contribute toward the first class service (actual service in troop units); another ten million will provide personnel for the Centers of Civilian Military Training, which prepare the second class reserves. The remainder, some twenty million, will be exempt from military service. The individuals from exempt municipalities are submitted to a physical examination and, if fit, are classified in the third class reserve.

Emphasis is placed on the quality and not the quantity in the present induction system. In the last draft, half of the men eligible were inducted. The troop units receive two-thirds of the trainees and the Centers for Civilian Military Training the rest. Under this system, the city dweller will carry the heaviest part of the load, instead of the rural dweller.

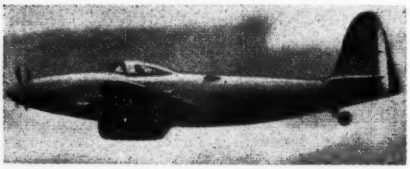
Half of the sergeants in the tactical and service units may enlist; the other half is discharged and transferred to the reserves. From the grade of second sergeant (equivalent to US staff sergeant) on up, the NCO can enlist and re-enlist up to the age limit, as long as he is physically fit, and possesses professional efficiency.

The Recruiting Office administers and supervises the Military Service. For each two million inhabitants there is a recruiting district which corresponds geographically to a state.—Brazilian Army Recruiting Office.

FRANCE

Arsenal VB 10c-1

The French Arsenal VB 10c-1 is a tandem two-motor low-wing cantilever monoplane, designed for use as a day or night fighter, or fighter-bomber. Armament includes four 20-mm Hispano cannon in the wing, and six 0.50 cal. Browning machine guns. Two 1,100-lb bombs, or eight 60-lb rocket-projectiles may be carried. The power plant is made up of two Hispano-



Suiza 12z 12-cylinder, liquid-cooled engines. Construction is all metal. Maximum speed is 435 mph, and the range up to 1,615 miles.—*The Aeroplane.*

Staff Course

The course for training French staff officers has been renamed "Centre de Formation des Officiers d'État-Major." The former designation was "École de Guerre."

The new course began in November 1947, will last nine months, and includes one month of service exercises.

Candidates must have served a minimum of six years as an officer with a minimum of four years as a troop officer, and be not less than twenty-eight nor more than thirty-four years of age. The written examinations took place in April and included a written composition on some current subject in which an officer should be informed, map reading, and tests in English, German, Russian or Spanish.

Approved applicants from the army must serve four months in air force and naval service schools before beginning the course.—*Ny Militär Tidskrift.*

INDIA

Allotment of Forces

The allotment of armed forces between the Dominion of India and Pakistan by the Partition Council gives a larger share of the Army and Navy to India on a basis of need.

To India goes the following Army units: fifteen infantry regiments, twelve armored corps units, eight and a half artillery regiments, and sixty-one engineer units. The Indian Navy receives four sloops, two frigates, twelve minesweepers, one corvette, one survey vessel, four trawlers, four motor minesweepers, four harbor defense motor launches, and all existing landing craft.

To Pakistan goes the following Army units: eight infantry regiments, six armored corps units, eight and a half artillery regiments, and thirty-four engineer units. The Pakistan Navy receives two sloops, two frigates, four minesweepers, two trawlers, two motor minesweepers and four harbor defense motor launches.

The Royal Indian Air Force and a few Army units remain to be divided.

The second stage of allotting the forces to the two new states will involve the voluntary transfer of individuals.

Announcement has also been made of the British officers who have been selected to head the respective land, sea, and air forces of both India and Pakistan.—*The New York Times;* Associated Press.

CANADA

Aerial Mapping

Towards the end of the year, an estimated 700,000 square miles of Canada will have been photographed by detachments of the Royal Canadian Air Force. Prior to the start of the project last summer, only five per cent of Canada's 3,695,000 square miles had ever been mapped in detail on an inch-per-mile scale.—*Time.*

AUSTRALIA

Naval Plans

Australian naval plans for the current year contemplate an expenditure of approximately $48,750,000, double the annual pre-war allocation. Besides the base planned on Manus Island, former American base, the Australian program includes the establishment of a permanent naval base on the Western Australian coast. During the war the main bases there were at Fremantle and Exmouth Gulf, about 1,000 miles north of Perth.—*Australian News Summary.*

Australians in Japan

Officials of the Australian army report that there are a total of 10,524 troops in the Australian Military Forces in the British Commonwealth Occupation Force in Japan. Only 167 Australian troops remain in New Guinea and New Britain. Three hundred and thirty-nine more are in other overseas areas on various special commissions.—*Australian News Summary.*

AFGHANISTAN

Air Force

The Afghan Air Force is part of the Army and is administered by the Chief of General Staff. The Air Force is organized into three squadrons, all of which come directly under the commandant for operational and disciplinary control. These squadrons are normally concentrated at Kabul airfield which also houses the Headquarters and a Flying Training School.

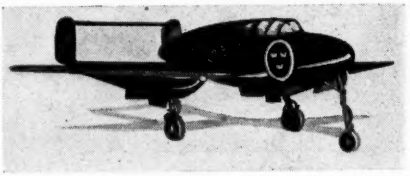
At present, the Afghan Air Force is equipped with Hawker Hind, Meridion Ali RO-37 and Tiger Moth aircraft; one Stearman bi-plane is available for training. There is a resident RAF pilot instructor in Kabul, who advises the Afghans on policy, training and administration. Thus, the Air Force today is largely influenced by Britain.—*Journal Royal United Service Institution.*

SWEDEN

First Swedish Jet Plane

Svenska Aeroplane A.B. of Linköping has produced and successfully test-flown the first Swedish-designed and built jet-propelled airplane. The jet power plant is the 3,000 pound static thrust de Havilland Goblin II, which is to be produced under license in Sweden by *Svenska Flygmotor A.B.* of Trollhättan.

The Saab-J-21R differs little in appearance from the Saab-21, which is in service with the Swedish Air Force as the J-21. Major modifications in the 21R are changes necessitated by the substitution of a jet motor for the piston motor, and the re-



designing of the tail unit with a high-positioned tailplane. The tricycle undercarriage seems to have been shortened in the jet version.

It is believed that 120 of the jet planes will be built.—*The Aeroplane Spotter.*

USSR

Aerial Mapping

During 1946 more than eleven million hectares of terrain were photographed from the air in the eastern and western areas of the Soviet Union.

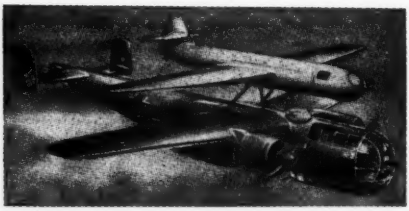
By this means, cartographic material was obtained for the construction of accurate maps of these areas. During the course of the current year, the photographing of an additional seven million hectares was planned.—*Skrzydlate Polska.*

GERMANY

DFS 228v-1 Rocket

A short-range, high altitude, high-speed photographic-reconnaissance aircraft developed by Germany was the DFS 228v-1. It was in the form of a rocket-propelled monoplane launched from the air after being towed or carried aloft by a Dornier Do 217k-2 aircraft.

The rocket plane had a single-seat cockpit designed as a pressure chamber. The cockpit could be jettisoned and the pilot ejected by compressed air after the cockpit had reached a predetermined height.



The power plant was a Walker HWK 109-509 bi-fuel, liquid-cooled rocket motor. The craft could fly at a maximum speed of 565 mph at sea-level, and had a range under intermittent power of 465 miles, and a glide range of 185 miles.—*The Aeroplane.*

JAPAN

Last Battleships

The last two battleships built by Japan, the *Musashi* and the *Yamato*, displaced 46,000 tons and were armed with nine 18-in guns. It was previously believed that their main armament was only 16-in as the fact that they mounted weapons of a heavier caliber was disguised under the term "special 16-in." These ships had been completed just before the attack on Pearl Harbor. Both were sunk during the Battle for Leyte Gulf.—*Journal Royal United Service Institution.*

ARGENTINA-CHILE

Argentine-Chilean Agreements

Argentina and Chile have signed agreements concerning the supply of nitrates to Argentina and explorations in the South Polar regions. The nitrate agreement provides that Chile will maintain in Argentina a minimum stock of 15,000 tons of sodium nitrate, for which Argentina will pay the prevailing world price. In the other agreement, the countries pledge themselves to recognize the other's rights in the Antarctic to take common action in explorations, and to conduct studies with a view toward reaching a boundary treaty.—Associated Press.

VENEZUELA

Naval Cadets

One hundred twenty Venezuelan naval cadets recently visited the United States on tour sponsored by the United States Naval Mission in Venezuela. Included in the tour were visits to the Naval Academy at Annapolis, and to the New York area where stops were made at the Grumman aircraft plant on Long Island and the New York Naval Shipyard in Brooklyn.—*The New York Times.*

PERSIA

Air Force

The Persian Air Force is an integral part of the Army. The Headquarters is at Teheran. It is organized into two Regiments—Bomber and Reconnaissance. Both are stationed at Teheran, with small detachments disposed from time to time in diffierent parts of the country.

It is equipped with Anson, Tiger, Moth, Hawker, Hind, Audaz and Fury aircraft. Hurricane IICs have been reconditioned for it by Persian engineers aided by a small team of Hawker and Rolls Royce personnel.—*Journal Royal United Service Institution.*

UNITED STATES

Defense Organization

James V. Forrestal, former Secretary of the Navy, took the oath of office as the first Secretary of Defense under the new national military establishment on 17 September. The oath was administered by Chief Justice Fred M. Vinson.

As a result of this action, the new unification act became effective under provisions of the law at midnight the same day.

Previously, the President had announced the appointment of the secretaries who will head the three services under the unification act. They are:

Kenneth C. Royall, Secretary of the Army, who had been Under Secretary and then Secretary of War.

John L. Sullivan, Secretary of the Navy, who had been Under Secretary of the Navy.

W. Stuart Symington, Secretary of the Air Force, who had been Assistant Secretary of War for Air.

Mr. Symington is the first Secretary of the Air Force under the law which separates it from the Army. Under the new set-up, only the Secretary of Defense has cabinet rank.

Among the other important defense appointments made by the President are the following:

Major General William H. Draper, Jr., Under Secretary of the Army.

Arthur M. Hill, chairman of the National Resources Board.

Rear Admiral Roscoe Hillenkoetter, Director, Central Intelligence Agency.

Rear Admiral Sidney W. Souers, Executive Secretary, National Security Council.

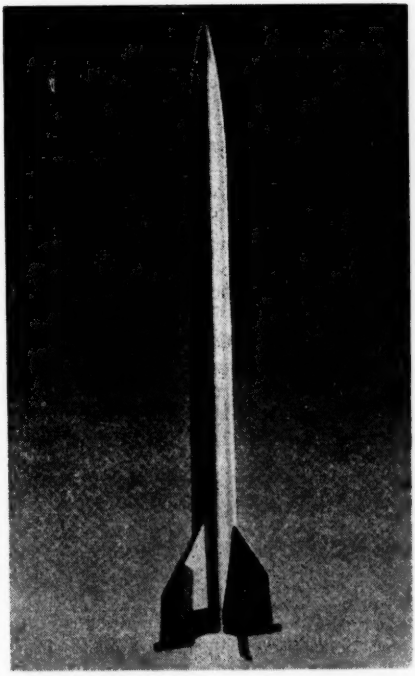
Thomas J. Hargrave, chairman, Munitions Board.

Dr. Vannevar Bush, chairman, Research and Development Board.

Major General Alfred M. Gruenther, Director, Joint Staff of the Joint Chiefs of Staff.—News reports.

Neptune Rocket

The Neptune rocket, designed to carry research instruments to a height of 235 miles, farther than ever before attempted, was built by the Glenn L. Martin Co., for the Navy. The Neptune is about one-third the weight, but about the same length as the German V-2, and can be easily distinguished from the V-2 because of its slender appearance. The nosepiece can carry from 100 to 2,000 pounds of measuring instruments. The rocket is launched from a vertical position. This is an artist's sketch of the rocket.—*The New York Times;* Navy photo.



The Navy's Neptune Rocket.

Kellett XR-10 Helicopter

The AAF's largest helicopter, the Kellett XR-10, is distinguished as the first twin-engine transport-type helicopter, and the first to be made of all metal. It has a

Largest AAF Helicopter.

top speed of over 100 miles per hour and can carry ten passengers in addition to the pilot and co-pilot. At a cruising speed of ninety miles per hour, the range is about 250 miles.—AAF photo.

New Oxygen System

A new liquid oxygen converter on the right in the picture below saves weight and space, as it replaces eighteen cylinders of the old system. The Air Matériel Com-

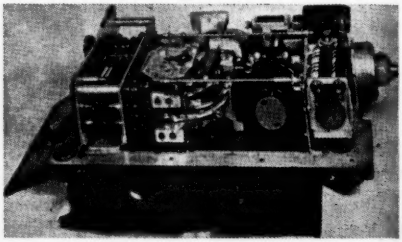
Liquid Oxygen Converter.

mand found that crews are able to stay at 40,000 feet for six hours, using the new converter.—AAF photo.

The Odograph

Developed in answer to needs revealed in the Army maneuvers of 1940, and later used by field units in every theater of operations during World War II, the odograph is an electronic device which automatically plots a line on a map indicating the course taken by the vehicle in which it is mounted. It was developed by the Corps of Engineers in its research and development organization at Fort Belvoir.

Odographs used by field units consisted of a plotting unit, a compass, and a power pack. The units weighed about 125 pounds and could be mounted conveniently in the rear seat of a jeep.



Odograph Plotting Unit.

The instrument operates as follows: The compass reading is transferred to the plotting unit through a mechanical linkage controlled by an optical system which includes two photo-electric cells, a mirror, and a thyraton tube. The plotting unit integrates direction of the vehicle and the distance traveled. The reading recorded on a map is the product of the distance traveled and the sine and cosine of the angle of azimuth. The scale may be varied by adjusting various controls.

The power pack is of the conventional vibrator type and takes its current from the storage battery of the vehicle in which the instrument is mounted. Error has been reduced to less than three per cent.—*The Military Engineer.*

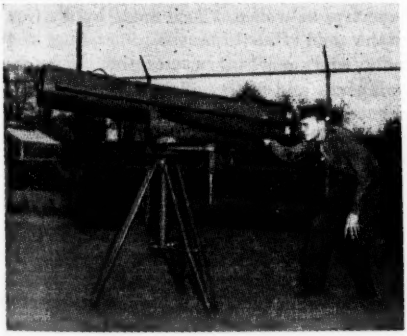
Special Weapons Project

The War and Navy Departments have announced a program and plan of operations for the Armed Forces Special Weapons Project. The project has been established as a joint Army-Navy organization which will discharge all military service functions relating to atomic energy.

Included in the program of the Armed Forces Special Weapons Project is the training of special personnel, military participation in the development of atomic weapons of all types, and the developing and effecting of joint radio-logical safety measures in coordination with established agencies. Close liaison with the Atomic Energy Commission is maintained through the Military Liaison Committee.

The principal field installation of the project is Sandia Base at Albuquerque, New Mexico.—News reports.

Long Distance Camera



A captured "Long Tom" German camera has been modified and tested recently at the Signal Corps Photographic Laboratories. In one test, using a FK 3m camera set at f/25, 1½ seconds, a dense red filter, a 120" focal length lens, and an ordinary infra-red plate, objects 25 miles away were sharply photographed.—*Signals.*

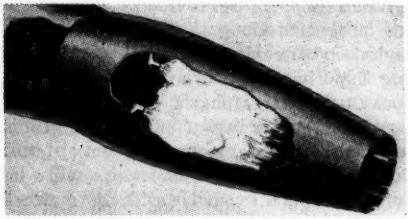
Flame Thrower

Extensive tests have been conducted recently at Edgewood Arsenal, Maryland, with the new Flame Thrower, Combat Vehicle, Main Armament, M5-4. The

mechanized flame thrower gun, installed in a special dummy 75-mm tube made of homogenous armor plate, fires a stream of liquid flame approximately 100 yards.—Signal Corps photo.

Jet "After Burner"

A device developed by Ryan Aeronautical Company, called an "after burner" is a type of ram-jet engine attached as an integral part to the after end of a jet



engine. The ram-jet effect is obtained by spraying fuel into a tailpipe where its burning produces one-third more power to the propulsion thrust.—*Science News Letter.*

Miscellaneous Notes

Railway Units

American railway companies have signed agreements providing for thirteen railway units under a program of the War Department which seeks to utilize specialized industries and manpower in the event of a future emergency. The new railway units include three military railway service headquarters, units, eight railway operating battalions, one railway grand division headquarters, and one railway shop battalion. The Transportation Corps also reports progress in affiliating units in the trucking industry.—War Department.

Hydronic Gardens

Army personnel, stationed in remote areas where lack of suitable soil, inadequate rainfall, or other difficulties preclude the growing of vegetables in the ground, are being supplied fresh vegetables from hydronic gardens where the plants are grown in beds of gravel, stones or other inert materials with water and nutrient chemicals. Such gardens are being operated on Iwo Jima; at Atkinson Field, British Guiana; Nanking, China; and at Chofu and Otsu, Japan.—War Department.

Recruit Training

Basic training organizations of Army Ground Forces are revising their training programs along the lines successfully tested by the Universal Military Training Experimental Unit at Fort Knox, Kentucky. Major emphasis is being placed on the extensive use of off-duty programs and moral and religious programs. Local volunteer civilian committees will be formed to advise and assist in matters of off-post conduct and recreation, and division commanders are authorized to institute the UMT trainee court and demerit system for enforcing military discipline and providing military justice.—War Department.

War Powers

Approximately 175 war powers of the President have been ended or scheduled for termination within a year by approval of a joint resolution of the Senate. Enlistments have been put on a peacetime basis, unemployment allowances end within two years, and educational provisions for veterans are limited, among many other provisions, under this action. The emergencies of 8 September 1939, and 27 May 1941, and the state of war continue to exist, however, and the Attorney General is continuing his study of the problems involved in termination of the remaining wartime and emergency legislation.—*The New York Times.*

New Submarines

Two new experimental submarines, expected to be the fastest in the world, will be completed by the Navy in 1951. The underseas craft will incorporate the latest submarine developments made in this country, as well as those made by the Germans and the Japanese, including new hull and machinery designs, new-type weapons, and more efficient sonar detecting equipment.—News reports.

NG Air Program

Ground units of the National Guard are receiving 780 light aircraft for use in artillery observation and liaison training, and a pilot training program at Fort Sill, Oklahoma, is underway in connection with the program. The planes being used include the L-4, L-5, L-16, and L-17.—War Department.

Anniversaries

The Army Air Forces celebrated its fortieth anniversary on 1 August. The Transportation Corps, youngest of the arms and services of the Army, celebrated its fifth anniversary 31 July.—War Department.

FOREIGN MILITARY DIGESTS

Russia in Asia

Digested by the MILITARY REVIEW from an article by Lieutenant Colonel J. V. Davidson-Houston in "Journal of the Royal Central Asian Society" (Great Britain) October 1946.

IN most instances the character and policy of a nation is determined by its physical environment, and nowhere is that more obvious than in the case of the Russians. The country is hedged about by geographical circumstances. On the European frontier in the early days, the Russians were constantly subjected to attacks by Finns, Scandinavians and other enemies from the north and west, and they were cut off from intercourse with Europe and from the influence of Rome. They therefore grew up quite differently from the rest of Europe. Later in history the density of population in Europe and the strength of the armies of Central and Western European Powers made it impossible for the Russians to achieve any sort of expansion in those directions. In the north there was the extensive Arctic front covered by the frozen desert known as the *Tundra*, and the sea itself, frozen for a great part of the year. Eastwards, on the Pacific seaboard, the Russians during their expansion have from time to time come up against, first, the Chinese Empire; secondly, the Japanese; and now American sea-power. Along the extended southern frontier, from the Pacific to the Black Sea, there is an expanse of desert, semi-desert and mountains.

In addition to this geological enclosure, the Russians have always felt themselves to be hedged about psychologically. In the early period of their development they were subject to constant attack by enemies—in fact, any foreign nation came to be regarded by the Russians as hostile. The obvious reaction to that physical and psychological feeling of being hedged about is an attempt to expand to the circumference of the ring, and, having done that, to try to break out somewhere.

Expansion

The history of Russian expansion is often regarded as something recent, but it has in fact proceeded ever since the Russians became a nation. It was a case of the flag following trade, and to a great extent it was directed by geography. The map of Russia shows a number of great rivers mostly flowing from north to south, or the other way, and connected by the valleys of their tributaries, themselves in many cases navigable rivers. The Russians tended to follow those tributaries of the great rivers, and that gave direction to their expansion. Every now and then they used to come up against a check, and whenever that happened they stopped and began to look somewhere else. Throughout Russian history there has been expansion followed by a check somewhere, and then a change of direction.

The first event in Russian expansion was in 1482, when Ivan III was pro-

claimed Tsar of all the Russians and for the first time united the various small principalities. He was the Prince of Muscovy, with Moscow as his capital. From that time until Peter the Great, Moscow remained the capital of Russia. As soon as the Russians consolidated themselves into a nation, they began to push out the Tartars and to occupy the Tartar kingdom of Kazan to the east, and in 1558 they entered Siberia. Expansion into Siberia was very natural. The Ural Mountains are no physical barrier, and Siberia is similar to Russia, a country of vast forests and steppes, through which flow great rivers with tributaries affording means of movement. The Russians also knew that there were furs, gold and spare land to be had in Siberia. The population was primitive and sparce, so that the Russians expanded quite naturally eastward across Siberia. They expanded so quickly that less than one hundred years later, 1638, they reached the Pacific. Here for the first time they came up against a Power, the Chinese Empire. It objected strongly to the presence of the Russians. There was a good deal of sporadic fighting, and eventually an agreement was concluded in 1689, the Treaty of Nerchinsk, by which the Russians agreed to halt on the line of the Argun River, which flows north and south some hundreds of miles west of the Pacific. The Manchus claimed all the country to the east of that, and the Russians had to be content with the territory to the west. This merely caused a change of direction: the Russians moved north-eastwards in the country of the Samoyeds and occupied Kamchatka; they also reached the Behring Sea and crossed into Alaska, which remained a Russian colony until 1867, when the Americans induced the Russians to sell it.

During this time, although their military expansion into Chinese territory stopped, Russia's political expansion continued, and by means of embassies, peaceful penetration and exchange of merchandise, the Russians during the next century established themselves very well in China, and there was actually a Russian Mission in Peking long before any of the other European Powers were admitted.

The next direction in which the Russians began to expand was in the Caucasus. In the time of Peter the Great, certain explorations and movements were made into the country between the Black Sea and the Caspian, which at that time contained territory belonging to the Persian and Turkish Empires. There was a certain amount to attract the Russians there: the valleys were fertile and there were minerals. This expansion continued slowly for a long time and was accompanied by campaigns against both the Turks and Persians, which were not consummated until after the Crimean War. The expansion into the Caucasus was a reaction to the failure of the Russians to reach Constantinople by the Black Sea. The British and the French had checked Russian ambitions in the Straits, and as offset they began to get at Turkey by the back door.

Another direction in which expansion began in the nineteenth century on a big scale was into Turkestan, east of the Caspian. The territories there were under Persian and Chinese suzerainties. The economic attractions were cotton, minerals, and the fact that through that area east of the Caspian ran the old trade routes between China, the Far East generally, Central Asia and the West. At this time there were two Khanates, Khiva and Bukhara, where the Russians found it necessary to assert themselves owing to the fact that their communications and caravans were being constantly raided by warlike tribes. In that part of Asia the Russians have been compelled at various times to subdue lawless peoples which raided their caravans and their peaceful

settlers, and having subdued those tribes and made them law-abiding, they had to protect them against other tribes which raided them. Thus one thing led to another, resulting in considerable expansion in and eventual Russification of most of Turkestan.

Later in the nineteenth century, having overrun Turkestan, the Russians found themselves up against the borders of Afghanistan and began to experience a check from that direction. Their appearance on the Afghan frontier naturally attracted the attention of the Indian Government. That is recent history. The Russians did, in fact, pause on the Afghan border at the end of the nineteenth century. In the meantime the Chinese Government had grown very weak, and the Russians took advantage of that to push on again in Eastern Siberia; they reached the Pacific coast and thus brought their eastern march to the sea.

In 1898 they leased, from China, Port Arthur and the territory where they built the entrepot of Dalny, the first ice-free ports the Russians had managed to acquire. Between 1891 and 1903 they completed the Trans-Siberian railway, joining Vladivostok to European Russia. That railway had two branches in the Far East, one of which went round the Manchurian border entirely in Russian territory; the other took a short cut straight through Chinese territory. That afforded the Russians a stake in Manchuria itself; it gave them communications to protect and country to exploit by means of the railway. They thus began to take an interest in Manchuria. They developed a branch of the railway south to Port Arthur, where they established a naval base. After the completion of this railway the Russians experienced another setback because they came up against the Japanese, and the Russo-Japanese War checked their ambitions in Manchuria. The Revolution followed shortly afterwards, which made it difficult for the Russians to achieve any further expansion. There was thus a period of stalemate, but to compensate for this lack of external expansion in the Far East and Europe the Russians began to busy themselves about the central part of their frontier, particularly in Mongolia and Sinkiang, where they were not up against any strong opposition. As they extended their sphere of influence there they also began to develop communications along the long land frontier; they completed the Turkestan-Siberian railway, joining the Trans-Siberian to the Turkestan systems; they established a line of air bases parallel to the frontier and air communication along the whole of the southern border. In spite of all this expansion, the total population of Soviet Asia is reckoned to be only 30,000,000 out of a total population for the whole empire of 190,000,000, so there is no pressure of population to account for this phenomenon.

Motive Forces

What were the motive forces behind this expansion? History shows that they can be, broadly, divided into three; desire for protection or security, economics, and out-and-out imperialism.

The security aspect can be further subdivided: the first and most important subdivision being the strategic one. From the defensive point of view the Russians wished to deprive any potential enemy of bases from which to launch an attack on their territory, and themselves to occupy bases convenient for attacking an enemy's territory. At the present time many of the resources of Soviet Russia—such as oil, coal, iron and the newly developed industrial areas—are near the frontier, and it is therefore desirable for them to control the territory beyond the frontier so as to make it difficult for an enemy to threaten these resources. In addition, the Trans-Siberian railway and the Turkestan

railway run near the border practically the whole of their way. In modern times the development of air attack and long-range weapons, such as rockets, makes it desirable to control territory further and further away from the centers of industry and population. In fact, there is no end to the range which one can claim to bring under one's control in these circumstances.

A second method of protection is to induce one's neighbors to be friendly or to be puppets, and the Russians have adopted those principles. Where they have not actually occupied a country with their armies they have encouraged the setting up of Communist Party governments or frightened the existing government into being friendly.

The third method of protection has been ethnic. Practically the whole way along the Russian land frontier the population on each side are of the same stock, and the Russian is a good assimilator. He has always mixed with the people—Turkoman, Tartar or whatever they might be—and he has been very successful in Russification, so that the population of the Soviet Union is far more homogeneous than that of the British Empire. This assimilation has a certain value offensively and defensively; if people on the other side of the frontier can be brought to think in the same way as those on the Soviet side it affords a zone of influence—as, for instance, in Persian Azerbaijan; it also encourages attempts to control the territories beyond the frontier, so that the Soviet people will not be influenced by their kinsmen on the far side.

Russia in Asia and Adjacent Countries.

Then there is the system of economic zones. When the Russians trade with a neighboring country they usually try to dominate that trade so that it is conducted to their advantage. There is also the question of protection of trade routes. The Russians in their earlier days often

had to subdue tribes who raided their trade routes or nations who threatened them, and having passified these, they had to protect them by dominating somebody else. That is not so important at the present time. The chief economic interest the Russians now have is to dominate or control the trade between their country and neighboring countries.

Another economic desire is to obtain ice-free ports. Geography has given Russia ports which are closed part of the year by ice, and she is always trying to find outlets to warm seas which will be open all the year round without the use of ice-breakers.

Lastly, there is simple imperialism, the idea of expanding wherever the soil is propitious. That went on under the Tsars, and it appears to be going on today. It is partly a question of prestige. The Soviet Union does not want to occupy an area smaller than the Tsar's Empire, and in late years has turned its attention to territories lost during the Revolution.

The Asian March

Let us then look along the Asiatic frontier.

Manchuria.—The present frontier is the Amur River—an ethnic frontier, not an economic one. Rivers are nearly always bad frontiers, because the economy of a country builds up on both sides of the river. But this is an ethnic frontier in that the population to the north is overwhelmingly Russian owing to colonization; while that to the south is overwhelmingly Chinese, also owing to the colonization which took place during the nineteenth century. In this case the Russians cannot claim to have fellow-countrymen on the far side. On the other hand, the Amur River is a great trade route, navigable by steamers, and is not a good frontier from that point of view; both banks really belong to the same unit. Russian interests in Manchuria are both economic and strategic. There are coal mines and unexploited minerals; there is a tremendous soybean output; and there are hides to be had from the considerable stock of cattle there. Manchuria also offers a number of ice-free ports—Port Arthur, Newchwang and Dairen in the south; Vladivostok, although on the same latitude as Madrid, is only kept open by ice-breakers in the winter. The Russians have also communications to defend; there is a railway running through Manchuria which they wish to be sure is free from threat by any other Pacific Power. We have seen, during the last few months, that the Russian troops which entered Manchuria at the end of the Japanese war have been induced to withdraw, but as the Central Chinese Government forces came into Manchuria to take over they find themselves opposed by Chinese Communist armies who seem to be taking the place of the Russians.

Korea.—To the south of Manchuria is Korea. The frontier between Korea and the Soviet Union is a short one, the estuary of the Tumen River. The Russians are obviously interested in Korea because it would round off their eastern seaboard and make it difficult for any other Pacific Power directly to threaten Vladivostok or Manchuria from that side, and it forms a right flank to their Far Eastern possessions. Again, Korea has some well-developed warm-water ports, particularly Seishin and Rashin, which the Japanese were completing just before the war. Again, Korea has never in modern times governed herself; she was first under Chinese and next under Jap suzerainty, and has not since set up any satisfactory government of her own. The country is occupied by Russian forces in the north and American forces in the south. The Russians in their zone have been encouraging the Korean Communist Party, which I should say is much better organized than any party in the American zone and may eventually, when the Russians and the Americans re-

move their troops, achieve considerable influence in the politics of Korea.

Outer Mongolia.—West of Manchuria is Mongolia, a neighbor with a hilly but not difficult frontier, including the Gobi, which is desert in parts but elsewhere supports considerable herds of cattle, sheep and ponies. There the Russians possess the advantage of having the Buryat Soviet Republic just north of the frontier, where the population is of similar stock to that in Mongolia. Communications are well-developed; there is a railway running from the Trans-Siberian line to Urga, now called Ulan Bator Khoto, the capital of Outer Mongolia. Russian interests in Outer Mongolia are partly economic; there is a well-developed motor road across Outer Mongolia into North China; there is also considerable pasture for sheep and cattle; there are many unexploited minerals. Another attraction is the fact that Outer Mongolia affords a kind of cushion to Siberia; it is a protective zone to the Trans-Siberian railway in case any hostile power tried to operate from North China. Mongolia has always been technically under Chinese suzerainty, but the Russians had considerable interests there long before this present century began, and during the Revolution they were afforded an opportunity to intervene in the country because a White Russian force had entered Outer Mongolia and occupied Urga. The Red Army came in, destroyed the White Army, set up the "Mongolian People's Republic" in 1921, and the country was organized on Soviet lines with Russian troops to see that it remained so. It is now an independent state, with strong Pro-Russian leanings. It is not possible, however, to get into Outer Mongolia from any direction except under Moscow's sponsorship. Russian influence over Outer Mongolia is going to have repercussions on Inner Mongolia, which has hitherto been much more under Chinese influence than Outer Mongolia. Now that Chinese Communist troops in North China have set themselves up in Inner Mongolia, there may be a pro-Russian sphere of influence right down to the Great Wall on the borders of China proper.

Tannu Tuva.—At the northwest corner of Outer Mongolia there is an interesting little country called Tannu Tuva. It is very mountainous and about one-third of the size of Germany, with a small population. Its only link with the outer world—that is, the U.S.S.R.—is either by air or along the valley of the Yenisei, a river running towards the Arctic. The population is Urian-Khai Mongol, akin to the Buryats of the Soviet Union. The chief Russian interests in the country are the considerable livestock grazed there and the fact that it stands in a central position between Mongolia, Chinese Turkestan and Soviet Asia. It was set up as an independent "republic" under similar conditions to Outer Mongolia, and even issued its own stamps. But quite recently it has become a province of the Soviet Union, apparently at its own request.

Sinkiang.—Further west is Sinkiang (or Chinese Turkestan). The frontier is mountainous and the country in the north of Sinkiang is quasi-desert, but communications with Russian territory have been improved considerably by means of the Turk-Sib railway and the road across the frontier to Urumchi, the capital. The distance from Sinkiang to the trade centers of China is so much greater than to Siberia or to Russian Turkestan that trade naturally tends to flow to and from the U.S.S.R. rather than China. Sinkiang has, therefore, long been subject to considerable Russian influence. The population of the country is mainly Turkoman, similar in race to the people of Russian Turkestan; there are also inhabitants of partly Chinese origin called Tungans. Periodically there have been Moslem risings against Chinese rule, of which the Russians have been able to take advantage

by sending in troops and occupying parts of the country. During these operations they succeeded in detaching a piece of Chinese Turkestan in the neighborhood of Lakes Balkhash and Issik Kul, which during the last century was made part of the Russian Empire; but there is no ethnic frontier, and the Turkoman-Moslem population flows over both sides of the political boundary. The chief interests, besides trade, are considerable resources of minerals not yet fully exploited, but which may possibly yield results if the Russians are able to develop them. Russian influence in Sinkiang has an inevitable effect on India, because there is a trade route over the passes into Chitral, where recently it has been reported that Russian piece goods are to be found in the bazaars. Indian merchants in Sinkiang have been suffering as a result of the increase of Russian predominance during the last twenty years or so, so that we could not be indifferent in India to Russian ascendancy in Sinkiang.

Afghanistan.—Further west is Afghanistan, the frontier of which is partly the river Oxus (not a very good boundary) and partly a line of mountains. It is not the ethnic frontier, because in Northern Afghanistan there are Tajiks and Uzbeks, who are kin to the inhabitants of Soviet Tajikistan and Uzbekistan. The ethnic line is the Hindu Kush, a range of mountains running northeast to southwest, south of which the people are Pathans with no ethnic connection with the Soviet Union. Russian interests in Afghanistan until recently have been entirely strategic, because occupation of Afghanistan puts them on the frontier of India, and, on the other hand, they affected to believe that the British had ideas of threatening their territory through that country. There are now signs that the minerals of Afghanistan, particularly oil, are interesting the Russians. They have developed communications into Afghanistan by two main routes: one is from the region of Tashkent on the Turk-Sib railway to Termez on the Afghan border, from where there is a road through Balkh to Kabul and so into India; the other route is from Merv, also on the Turk-Sib railway, to Herat. Herat is a center of communications with Persia, Baluchistan and India.

Persia.—Perhaps the most interesting country at the present time is Persia, the frontier of which has been moved back and back for a number of generations. Much of the territory in the Soviet Union was part of the Persian Empire. The frontier at the moment follows the Araxes River (west of the Caspian), the southern shore of that sea, and roughly the line of the Atrek River to the east of the Caspian. The population in the north of Persia is similar to the Soviet inhabitants in the south of the Union. On the west the Armenians lie opposite the Armenian Soviet Republic, the Azerbaijani are neighbors to the Azerbaijan Soviet Republic, and the Turkomans live next to the Turkmenistan Republic, which makes it easier for the Russians to assert their influence in North Persia. The Persian proper does not come up to the frontier; his home is in the Middle and Southern Persia. The chief Russian interests in the country, besides its races, are oil and grain. Moscow has recently succeeded in achieving an agreement regarding North Persian oil by putting pressure on the Persians. The oil fields of the Caucasus are believed not to be yielding as much as they did, and the Russians therefore want new sources of oil in the same part of the world. Most of the grain of Persia is grown in the north; if therefore, they were able to assert themselves in North Persia, the Russians could put pressure on the whole country. They would like to control the southern Caspian shore to give them east-west communications and avoid sea journeys across the Caspian. Again there is the ever-present lure of warm-water harbors. In South Persia

there is the newly developed port of Bandarshahpur, joined with the Caspian by the Trans-Persian railway, both of which were completed shortly before the late war. If, therefore, the Russians were able to secure special rights in ports on the Persian Gulf, they would find the Trans-Persian railway available for their use. Among the methods they are adopting at the moment is that of seeking the sympathy of the border races, and I note that they have been encouraging the establishment of a Kurdish autonomous government, although there are no Kurds in the Soviet Union itself. The significance of this is that there are Kurds in Asia Minor and in Iraq. Therefore, the establishment of any sort of Kurdish government in Persia would have an effect in Northern Iraq and in Eastern Turkey. Again, there is a political party in Persia called *Tudeh*, which appears to be organized rather like the Communist Party. Its point of view has openly been expressed as anti-British and pro-Russian. It is not a racial organization: it is a general political party which has a certain amount of influence in all parts of Persia. The withdrawal of our forces has left Russia with relatively greater influence, and the Anglo-Iranian oil interests in the south are without any protection other than international goodwill. It is significant that the company is having labor troubles fomented by the Tudeh Party.

Turkey.—The last country on our tour is Turkey, whose frontier with Russia is the Caucasus, always unstable because the people in the area are neither Turks nor Russians. The Russians have been advancing in that area for generations; in 1878 they occupied Kars and Erzerum and in 1886 they occupied Batum on the Black Sea. Recently the Russians have been putting considerable pressure on Turkey; an article in a Russian newspaper even argued that certain areas should be given to Russia because they are ethnically Georgian, and, although the Georgians are not Russians, there is a considerable Georgian population in the Soviet Union. The object all the while has been to obtain a warm-water port. Constantinople and the Straits lead to the Mediterranean and the sea lanes of the world. We have heard of the demands for influence in Tripoli and the argument over the port of Trieste. If the Jugoslavs controlled Trieste, their friendship with Moscow would give the Russians facilities in the Mediterranean. Pressure has also been exerted in Bulgaria, where the concentration of Russian troops caused a certain amount of alarm to the Turks in Thrace; again, any Kurdish national movement is bound to have repercussions on Turkey's eastern territory.

Conclusions

The Russian land frontier in Asia has consistently shown itself to be unstable, and the expansion of Russia can be attributed to three motive forces: first, an exaggerated desire for security against a possible enemy; second, the tendency to assimilate neighboring peoples and, having assimilated them, to take an interest in any other cognate peoples across the frontier; third, economic and political imperialism, one of the strongest factors in which is the desire for ports on the open sea lanes of the world. There is another factor which I think needs further investigation, and that is the possible desire to keep considerable parts of the Russian armies abroad for a few years rather than bring them home and make recovery more difficult.

The expansion does not arise from any need of living space. Their economic needs appear to be somewhat exaggerated. Perhaps we can yield that in Persia the desire for oil is natural, because the Persian oil fields are in the same area as the aging fields worked by the Russians

and would be most convenient to the Soviet Union, as would the resources of other minerals not yet thoroughly exploited.

These factors have led to continuous encroachment, which will continue so long as the motive forces remain and there is no effective opposition. It must be remembered that all these countries from the Pacific to the Black Sea are weak, and have depended in recent years on the backing of Great Powers to prevent any encroachment in their territory. Unless the Great Powers take an interest not only in what happens near home but also in the whole of Asia, the Russian expansion is likely to continue. One of the main difficulties arises from *faits accomplis*. Once an area is occupied, or a sphere of influence is established, it is much more difficult to take steps than if something had been done to prevent or foresee the event.

Discussion

Manchuria.—Although for many generations this has been to all intents and purposes a Chinese country, it has always held a quasi-feudal status, and has not been directly subordinate to the Chinese Central Government. There is no doubt that if the Chinese were left to themselves, the Manchurian provinces would come to be treated as other parts of China; hence China's resentment at the Allies' yielding to Russia's insistence on her special rights there.

Persia.—Russia's interest in Persian oil does not necessarily imply that the Caucasian sources are exhausted; it may be due to the need for further sources to match her industrial expansion, and to the fear that other powers might secure concessions in North Persia.

Turkey.—The disputed border territories (Kars, Erzerum, etc.) were taken by Russia from the Ottoman Empire in 1878, but were recovered by Turkey during Russia's weakness in 1921. The inhabitants are neither Turkish nor Russian, so that this frontier will remain unstable until a spirit of accommodation animates these two powers.

German Armor In France

Translated and digested by the MILITARY REVIEW from an article by Major Rogé in "Revue Historique de l'Armée" (France) No. 1, March 1947.

How many tanks did the Germans use against France in May 1940?

To answer this much discussed question, the author interviewed General Guderian at the American prisoner of war camp at Allendorff in November 1946.

General Guderian's efforts had occupied a prominent place in the evolution of the modern German Army. He conceived the armored division, formulated the rules for its employment, and codified its tactics in the 1940 regulations. His book, *Achtung Panzer*, established him as a leader in armor.

He put his doctrine of employment of armor into practice in the Polish campaign. As commander of the 19th Armored Army Corps under General von Kleist in the offensive against France, he was charged with the decisive operation of the campaign. He forced the passage of the Meuse at Sedan on 13 May, and in the last half of June, 1940, he encircled the group of French Armies of the East at Epinal and Gerardmer.

The interview follows:

Question: How many armored and motorized divisions did the German Army possess on 10 May 1940?

Answer: The German Army on 10 May

1940, had ten armored and six motorized divisions. All were engaged against France on 10 May.

Question: Did the German Army possess any separate armored units in addition to the armored divisions?

Answer: The German Army possessed no separate armored formations.

Question: How many tanks were there in each armored division?

Answer: The ten armored divisions were not made up in the same manner and did not possess the same number of tanks. Divisions 1, 2 and 10 each had 276 combat vehicles. Divisions 3, 4 and 5 each had 324 combat vehicles. Divisions 6, 7 and 8 each had 218 combat vehicles. The 9th Division had 229 combat vehicles. This gives a total of 2,683 combat vehicles of categories 1, 2, 3 and 4, to which should be added the commanders' tanks and armored cars.

Question: Would you be able, on the basis of the document you possess, to indicate the number of commander's tanks and armored cars in the armored divisions?

Answer: Each armored division had three commander's tanks, which makes a total of thirty. Each armored brigade had four commander's tanks, which makes a total of forty tanks. Each armored regiment had three commander's tanks, which makes a total of sixty tanks. Each armored battalion had three commander's tanks, which makes a total of 120 tanks. Each artillery regiment of the armored divisions had seven commander's tanks, which makes a total of seventy tanks. This gives a grand total of 320 commander's tanks.

Question: The total number of tanks of the ten armored divisions was, therefore, 2,683 plus 320, or 3,003 tanks?

Answer: That is correct. But it is a theoretical figure. It was not reached, and we did not employ more than 2,800 battleworthy combat vehicles.

Question: We should also count the armored cars. How many of these did you possess?

Answer: Fifty-six for each armored division or a total of 560; twenty-four for each motorized division or a total of 144; and three for each division of infantry on the active list, or a total of 108. This makes a grand total of about 800. But this theoretical figure was not reached and the number of armored cars should be estimated at about 700.

Question: Were all infantry divisions supplied with three armored cars on 10 May 1940?

Answer: Only the thirty-six divisions of the active army were provided with three armored cars.

Question: According to your figure, the total number of armored combat vehicles employed against France in 1940 did not exceed 3,500?

Answer: That is correct. However, we did have at our disposal some one hundred tanks, armored cars and self-propelled guns in Norway and the schools of Germany.

Question: Were there tanks and armored cars in process of construction in the armament factories at that time?

Answer: Certainly, but I do not recall how many such there were on 10 May 1940.

Question: Did armored divisions 12, 13, 14, 15, 17 and 24 participate in the campaign of France in 1940?

Answer: No, these divisions did not exist at that time, but studies were in progress for their organization and formation.

Question: What was the figure for the armored and motorized divisions in condition for combat on 1 September 1939?

Answer: Germany engaged against Poland all the armored and motorized divisions at her disposal, namely, four armored and five motorized divisions.

Question: How was Germany able to put

ten armored and six motorized divisions into the line by May 1940?

Answer: The cadres and troops existed and were already trained in the use of tanks. The equipment was constructed during the period between September 1939 and April 1940.

Question: Did the captured tanks of Czechoslovakia and Poland permit the formation of armored divisions?

Answer: The doctrines of employment of tanks in Poland and Czechoslovakia were not the same as in Germany. Hence the foreign equipment would not answer the purposes of the German General Staff. The equipment was not interchangeable.

Question: Did you capture many French tanks in France in 1940?

Answer: The number of tanks seized in parks in France was not very great.

Question: How many armored and motorized divisions were engaged against Russia in June 1941?

Answer: Twenty-four armored and ten motorized divisions including S.S. units.

Question: How many armored and motorized divisions were created between the month of July 1940 and June 1941?

Answer: Fourteen armored and four motorized divisions.

Question: Were these divisions of the same type and composition as those which fought in France in May 1940?

Answer: No, they were less powerful. Each of the twenty-four armored divisions possessed only three battalions of tanks instead of the four in the armored divisions of 10 May 1940. Armored divisions Nos. 1 to 10 each lost one battalion of tanks. Thirty-two battalions of tanks had been created. The armored divisions which were engaged against Russia in June 1941 each had a strength of some 180 tanks while their minimum strength in the campaign of France was 280 tanks.

Question: Did not the German General Staff attempt to reorganize the armored divisions during the course of the war, providing each with four armored battalions as in 1940 during the French campaign?

Answer: To our great regret, we were unable to increase the numerical strength, in the matter of tanks, of our armored divisions. We did not have enough tanks for the operations we had undertaken in Russia and Africa.

Question: Nevertheless, was not the tank production of German industry very high, considering the means at its disposal?

Answer: Our monthly tank production passed from 250 per month at the beginning of 1940 to 500 at the beginning of 1942, reached 800 at the beginning of 1943 and 1,000 at the end of 1943. From the summer of 1944 on, production fell off and continued to do so until April 1945. Then too, the multiplicity of the types constructed often slowed down production.

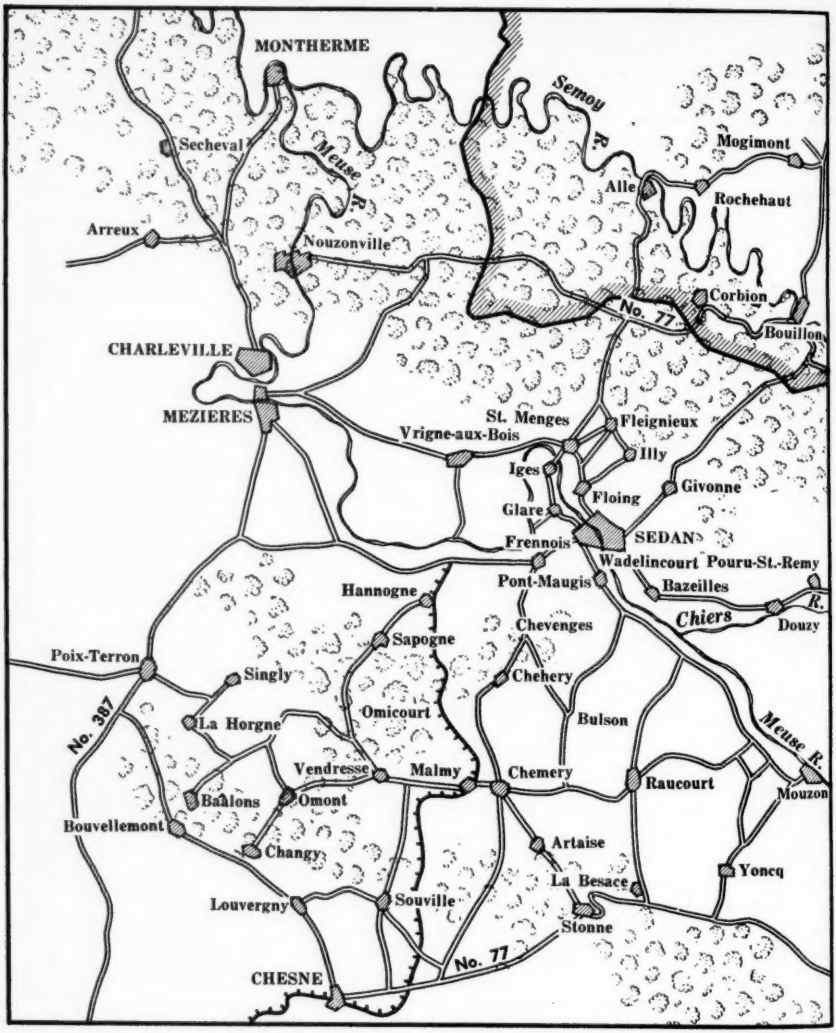
Question: This being the case, why was it not possible to reinforce the armored divisions?

Answer: Our losses, on the Russian front particularly, were so great that the tanks coming out of our factories served simply to replace those that had been destroyed or worn out. We did, however, increase the number of our armored units, raising to thirty-four the number of our armored divisions. But in each division, the number of tank battalions decreased and the number of tanks in each armored division did not exceed 100 or 120 by the end of the war.

Question: How did Germany handle the fuel problem so as to supply her armored and motorized divisions, her air and naval forces, during the war?

Answer: Germany's production of synthetic gasoline was insufficient, even with the help of Austrian oil. The Rumanian oil was indispensible for continuing the war.

Question: Were Germany's war industries able to aid her allies, Italy, Finland,



Hungary and Rumania in weapons and other equipment?

Answer: In spite of the production attained by the armament industries, our losses were such that it was not possible to arm Germany and her allies in a uniform manner. Hence, the armies allied with Germany were less well armed, especially as regarded tanks, armored cars and antiaircraft guns, than the German Army.

Leaving, for the moment, these matters

of a technical nature, the subject of the French campaign was broached. The information thus gathered, will perhaps permit, to a certain extent, the completion of the French records and give an idea of the significance of the maneuvers carried out on the two sides.

"The original plan of the invasion of France," said General Guderian, "consisted in the unreserved execution of the Schlieffen plan, characterized by a powerful attack by the German right wing across Holland and Belgium, reaching the French Channel coast. But in November 1939, a German courier carrying confidential orders on the plan of invasion, unfortunately landed at Brussels instead of Cologne, and Hitler decided to change the plan for the Invasion of France. The main maneuver then consisted in making the decisive effort in the center, through Luxembourg and southern Belgium, reaching the Meuse at Sedan and piercing the Maginot line at this point. If the maneuver succeeded, it would permit a rapid march toward the mouth of the Somme and would insure the separation into two parts of the Franco-English forces, one in Belgium and northern France, the other in the east, inside the fortifications of the Maginot line. This military operation was to be of decisive importance and the outcome of the western campaign depended on it. The offensive of the Central Group of Armies was prolonged by the attack of the Northern Group of Armies across Holland and Belgium with the aim:

"1. Of causing the Allied High Command to believe, and continue to believe, that the Schlieffen plan was being followed;

"2. Of encircling the Franco-Belgian Armies in northern France, in conjunction with the Central Group of Armies."

Question: What role, General, were you personally to play in the execution of the new plan, and what did you think of this plan?

Answer: In November 1939 I was at Coblenz. I was called by Hitler to give my opinion of the new plan. In case I approved of it, I was to have charge of its preparation and direction as far as the armored arm was concerned. But I had already studied it and had even already proposed it to General von Manstein, von Rundstedt's chief of staff, before being called by Hitler.

A comparison of the two plans showed the following advantages in the new one:

I. According to the information supplied by the German intelligence department, the Franco-British High Command was looking for Germany to make use of the Schlieffen plan. The French High Command had concentrated most of its armored and motorized forces on the Belgian frontier and, in the event this plan was followed, these appeared to be ready to penetrate into Belgium as soon as the German invasion began.

II. The field defenses both in Belgium and Holland confirmed the fact that the enemy was getting ready to block the execution of the Schlieffen plan. On the other hand, the Belgian defenses on the Luxembourg frontier were weak.

III. In the Sedan sector, in the center of the Franco-British positions, the Maginot Line was unfinished and did not possess the strength of the Lorraine and Rhine fortifications.

IV. The concentration of enemy forces in the Sedan area brought out the weakness of the German divisions when spread over large fronts with a part of them belonging to the second reserves.

V. The surprise factor could be decisive. A profound study of the plan proved that it would be necessary to make use of more than the three divisions called for by the Schlieffen plan. It was not hard to persuade the High Command of the need to use all available armored and motorized divisions.

Question: What command did you pos-

sess in the execution of the plan of the campaign against France?

Answer: In the Central Group of Armies commanded by General von Rundstedt there had been organized an armored formation under General von Kleist which was made up of the XIV, XXXVIII and XIX Armored Corps. I was given the command of the XIX Armored Corps.

Question: How did you handle the instruction and training of the cadres and men during the war?

Answer: For the first time I had the opportunity to organize the detailed preparation of an operation, orientating the divisional generals and training the troops in maneuvers. For several months I trained the forces, first in war games, then in the terrain of the Eifel area, which is similar to that of the Ardennes, in the detailed execution of the maneuvers which were to be conducted in Luxembourg, in Belgium and on the Meuse in France from J-day to J-day plus 5.

The staffs and men of the 19th Armored Corps had reached so high a degree of perfection in their training that the orders for the corps, divisions and regiments were made out as far along as J-day plus 5. From 10 to 15 May, I did not have many changes to make in these orders which were issued when the time for them arrived, like the different acts in a play.

Question: How were the generals and corps commanders of the XIX Armored Corps designated?

Answer: I myself chose my subordinates from those with whom I was well acquainted. My chief of staff, General Nehring, who the following year was to command the *Afrika Korps*, understood me by looking at me. My method of command, however, was very simple and very rapid. It consisted in giving my orders solely by radio, and coded. I always had with me a radio officer and a code officer. From my tank I transmitted orders directly to my subordinates, whom I visited on the front line. Written orders were edited by my chief of staff and did not exceed one or two pages in length.

Question: What was the composition of the XIX Armored Corps on 10 May 1940?

Answer: The XIX Armored Corps was made up of three armored divisions, the 2d, 1st and 10th, from right to left. The 1st, in the center, was followed by the staff of the XIX Corps and the separate elements, that is to say: one regiment of armored artillery (two groups of 105s and one group of 150s), one regiment of *flak* (antiaircraft artillery), one observation squadron, one signal corps battalion, one engineer battalion and the *Gross Deutschland* regiment. Each armored division comprised one regiment of armored artillery of three groups (two of 105s and one of 150s), two regiments of tanks, two regiments of motorized infantry, one motorized reconnaissance group, one motorcycle battalion, one engineer battalion, one signal corps battalion, one antitank battalion, one flak company, one reconnaissance squadron and motorized services. With its 900 tanks and its twelve groups of artillery, four of which were 150s, the XIX Armored Corps had concentrated within it both power and speed. Both men and cadres were certain of victory.

Question: How did you cross the Meuse on 13 May and break through the fortified French position at Sedan?

Answer: Routes had been reconnoitered and the choice of the attack sector, between Sedan and Saint-Menges, had been made in advance. The main problem was speed of execution: the most rapid possible crossing of the Meuse. By 12 May, the 1st Armored Division had taken Sedan while the 10th was entering Bazeilles and Balan. The 2d had been stopped before la Semoy. General von Kleist ordered the attack at 1600 on 13 May for the purpose of crossing the Meuse. I would have preferred to wait till the 14th in order to have the use of my three armored divisions. The attack

planned for 13 May was to develop on a narrow front (2½ km.) between Sedan and Saint-Menges, after a concentrated fire preparation by artillery and aviation. General von Kleist desired a very short but brutal preparation. I, on the contrary, desired a preparation of two hours duration in order to obtain a demoralizing effect by the prolonged action of the *Stukas*. The attack was to be led by the 1st Armored Division reinforced by the *Gross Deutschland* regiment on a front of 2½ kilometers between Sedan and Saint-Menges. Its engineer battalion was to be reinforced by the corps engineer battalion. The artillery of the 1st Armored Division was to be reinforced by the corps artillery and was to be aided by the fire of the groups of 150s belonging to the 2d and 10th Armored Divisions which, from their positions, were able to fire into the sector of the 1st Armored Division. The fire concentration of the 1st Armored Division on a front of 2500 meters was to comprise:

The two groups of 105s of the 1st Armored Division.

The two groups of 105s of the Corps Artillery Regiment.

The group of 150s of the 1st Armored Division.

The group of 150s of the corps artillery.

The group of 150s of the 10th Armored Division.

The group of 150s of the 2d Armored Division.

The AA fire in the attack sector was to be provided by the *flak* regiment of the XIX Corps.

Question: When did the artillery preparation take place; how long did it last; what was the rate of fire?

Answer: The artillery preparation was to last from 1400 to 1600 on 13 May. Normal rate of fire from 1400 to 1540; rapid rate of fire from 1540 to 1600.

Question: What was the mission of the artillery?

Answer: The mission of the artillery was to destroy the French positions south of the Meuse, and particularly the artillery positions, command posts, supply columns and casemates.

Question: What was the mission of the aviation?

Answer: The aviation was to insure air supremacy during the 13th and particularly from noontime on. Before the attack, I had dealt with the *Luftwaffe* concerning the employment of its forces. I had asked the dive-bombing forces to destroy the French artillery and to spread its action over the period between 1400 and 1600 with maximum intensity from 1530 to 1600. Liaison between the XIX Corps and the air force had been worked out in great detail. In addition to the organic reconnaissance aviation of the XIX Armored Corps and the fighter squadrons which insured us air supremacy, twelve squadrons of dive bombers took part in the attack.

Question: What was your impression on 13 May of the French defense on the banks of the Meuse?

Answer: I noted that the southern bank of the Meuse was but little defended and that the enemy forces appeared weak. Hence, I decided to destroy the casemates that had resisted the artillery preparation by bringing our 88s to the north bank of the Meuse and firing directly into the embrasures of the casemates.

Question: What was the situation at 1600 at the moment of the attack?

Answer: At 1600 the attack succeeded and the armored infantry easily crossed the Meuse in pneumatic boats. The construction of the bridge was immediately begun. The surprise had been complete, Anglo-French aviation was gone. The French artillery, overwhelmed by the artillery fire and *Stuka* attacks was falling back. The casemates had either been destroyed or taken without defenders.

Question: How did the attack develop south of the Meuse?

Answer: At this time, the 2d Armored Division was still halted before la Semoy and the 10th had not yet succeeded in crossing the Meuse. It was the 1st Armored Division that was to play the decisive role. On the afternoon of the 13th, the tanks and artillery of the 1st Armored Division crossed the bridge to the south side of the Meuse to attack the principal position of enemy resistance in the direction of Chehery, in order to support the action of the brigade of armored infantry of the *Gross Deutschland* regiment.

It was 1800 when the attack began on the principal position of enemy resistance, south of the Meuse. By the end of the afternoon, this position had been broken through over a front of five kilometers and the *Gross Deutschland* regiment had progressed a distance of six kilometers south of the Meuse.

Question: What would the situation have been at 1400 if the French had begun their counterattack at dawn?

Answer: It would have surprised the 1st Armored Division in a difficult situation, and the more so since at this hour I was not yet able to count on the 2d Armored Division. But a few hours later, the 2d Armored Division, which had succeeded in taking la Semoy, crossed the Meuse and supported the 1st Armored Division in its repulse of the counterattack of the French tanks.

Question: Is it not true that the Franco-English and Belgian aviation attempted to destroy the bridge over which all the communications of the XIX Corps passed during the day of 14 May?

Answer: This day was critical, for the Franco-English aviation was mistress of the skies at Sedan as a result of the departure of the German aviation for another sector.

Question: How did the XIX Corps resist these attacks and by what means was the bridge protected?

Answer: It was the *flak* regiment of the XIX Corps which, owing to the skill with which its position had been chosen and the accuracy of its fire, was more than a match for the French aviation. In spite of their courage, the enemy aviators were not able to destroy the Saint-Menges bridge (between Sedan and Saint-Menges). More than 150 enemy planes were destroyed.

Question: What decision did you take at the end of the afternoon of the 14th in view of the failure of the French counterattacks both on the ground and in the air?

Answer: In spite of the spearhead position of the XIX Armored Corps, I decided to push the 1st and 2d Armored Divisions westward for the purpose of disorganizing the rear of the Ninth Army and profit from my success by exploiting it as rapidly as possible. I insured the security of the movement of the 1st and 2d Armored Divisions by assigning to the 10th Armored Division, reinforced by the *Gross Deutschland* regiment, the task of protecting our left flank in the direction of Paris until the infantry units of Marshal von Rundstedt could arrive and relieve the 10th Armored Division south of the Meuse at Sedan.

Question: In your opinion, what action could the French have taken to stop your maneuver?

Answer: From 15 to 17 May, the only means available to the French for avoiding the catastrophe that awaited them, if the thing were possible, would have been a combined counterattack by eight divisions of the army of General Frère and the armored division of General de Gaulle, on the flank of the XIX Corps which was moving westward.

Even if this counterattack had not succeeded it would have resulted in an arrest of two or three days' duration of the advance of the XIX Armored Corps. General

de Gaulle's counterattack seems to me to have failed owing to lack of sufficient gasoline, and that of General Frère was not put into execution.

Question: Did the German General Staff believe in your victory on 10 May 1940?

Answer: Many were skeptical of the results of my maneuver. I was obliged to do a great amount of fighting in Germany to obtain the triumph of my tactics in the employment of armored divisions. But in my corps, everyone, officers, noncommissioned officers and men, were sure of victory.

Modern Military Trends

Translated and digested by the MILITARY REVIEW from an article by General Tristão A. Araripe in "Defesa Nacional" (Brazil) January 1947.

TODAY the thoughts of military men, and particularly those responsible for national security, center around the question: What will be the form of tomorrow's warfare, and what weapons and methods will be employed?

The less cautious urge that we abandon the usual methods, practices and weapons of war and adopt the revolutionary means of the "atomic age"—jet-propelled planes, radio-controlled weapons, the atomic bomb, etc.

The more cautious, however, recall that there never has been a revolution in the art of war, but it has evolved, and that the wisest course is to determine and interpret the form of this evolution, by the study of the past.

It is important to interpret accurately this evolution to avoid errors such as those made by the French in their defensive doctrine and the Maginot Line, or by the Germans in refusing to take into account the Russian territorial expanse and population and the industrial capacity and population of the United States.

Recent Military Evolution

Two significant dates mark recent military evolution.

May 13, 1940, marked the clash of one military system, represented by France, which was on a high plane of evolution but bound by traditional methods, with another system fostered by the Nazis which was evolved toward modern motorized warfare.

December 7, 1941, saw the birth and expansion of another system by the United States. This system manifested the characteristics of universal war rather than total war, and the utilization of the resources of war without limit. The breakthrough of the Dinan-Sedan front, with the resulting defeat of the Belgian, French and British forces, proved the power of the Nazi system just as the disaster at Pearl Harbor served to launch a war machine of hitherto unsuspected characteristics.

Six years of fighting brought the following into contrast: 1) The French military system, influenced by old military tradition and the overwhelming victory of 1918.

2) The military system of the Third Reich, likewise based on solid military tradition but revolutionized by the mass and shock of the armored arm and aviation made possible by a war industry prepared over a period for *Blitz* warfare.

3) The British system, peculiar to the Empire and especially that of Great Britain, its navy, industrial capacity and the inexhaustible Commonwealth reserves.

4) The Soviet system, in which the war machine was geared with the steadily advancing political, administrative and economic objectives of the revolution.

5) The Japanese system, with its theo-

cratic and medieval characteristics which attained some success in adopting the experiences of its occidental allies to the fanaticism of the Japanese people.

6) The system of the United States which was organized like an industry in which efficiency, specialized workmen and tools, scientific and inventive intelligence, and overwhelming quantities of supplies, combined to produce victory.

Victory in Organization

The wars of the second half of the nineteenth century had revealed the complexity of the organization of war. From the elementary campaign plans and unilateral plans of mobilization, an evolution was to occur that would embrace all spheres of national activity.

On the eve of World War II, a few nations had established a law of national organization for time of war. Yet it must be admitted that only the Third Reich and, in a way, Japan, had made an all-out effort to effect a total organization. Germany, from 1932 on, was engaged in transforming herself, under the complacent eyes of the other nations, into a mighty, modern war machine. Under the Nazi rule, ideas were translated into methodical action on a colossal scale. All the parts of this great machine were carefully prepared, and the successive acts of the great drama unfolded themselves under the eyes of a director who turned the indifference and weakness of other nations to his profit. The machine broke down, as time went on, in the face of the action of a greater resistance than the machine was able to overcome. But we cannot help recognizing that it was an almost perfect type of modern war organization.

The Soviet Union was attempting to follow in the steps of Germany, but seemingly its industrial and economic capacity did not allow it to make a great advance in this direction.

Dragged into the war, England, and later the United States, determinedly decided to organize for victory, and set an example which should, in the future, be followed by other nations. The preparation and organization which they carried to the highest degree of perfection represents the principal tendency of the present and the future. In both conception and execution, efficiency only was sought; efficiency in combat organization, efficiency in war and civil industries, efficiency in personnel and matériel.

The recruiting, selection, and training of personnel, with universal application of the principle of "military occupational specialization," constitutes, perhaps, the greatest feature of the American system. The application of this principle is also indicated by the growing idea that technicians specialized in the waging of war should dominate in the composition of armed forces.

General Marshall has called attention to the importance of the efficiency of the human component and discussed the various factors to be considered in its solution. We hardly need stress the fact that with the mobilization of fourteen million men, the United States found itself with ninety divisions, while Germany had 318, Japan 120, Italy seventy, and Russia claimed to have 550. The advantage lay in the fact that the fighting capacity of this small number of divisions was 100 per cent, due to the system of training and replacement and the quality of armament and equipment employed. The tendency is evident to replace numbers by specialization. Only in this way will it be possible to meet the requirements in the air, on the sea and on the ground, with the growing demands for transportation, supplies and production.

The war was also won with equipment. From the most highly perfected bombing plane or most powerful battleship, to the simplest piece of individual equipment, nothing was spared to the aim of conquering with as little sacrifice of lives as pos-

sible. The efficiency of combat organizations resided more in the quality and quantity of their armament and equipment than in their numbers.

In the operations as a whole, as well as in the staging of each individual operation, logistics served as the essential base of strategy and tactics. The time lost in rearming and equipping operational bases was regained by the vigor of the blow that was delivered and the speed with which the operation was developed.

The necessity for organization increased with the prolongation of the war. The experiences of the campaign provided lessons which were immediately taken advantage of. The perfection of equipment, the salvaging and maintenance of equipment, and the incessant search for new combat weapons, demanded ceaseless anticipation of future developments, plans, and means for winning victory. Above all, science and industry, with their extensive production, kept minds in a state of alarm in the face of the possibilities of new means of destruction.

Because the first attack in a future war may be unexpected and devastating, it is necessary that the armed forces of today constitute a national military organization ready for instant action. The repetition of another Pearl Harbor or several greater disasters will, perhaps, not permit so long a period of preparation as was accorded the United States.

The Armed Forces, Science and Invention

Some comparison can be made between the ground operations of World War I and World War II, the latter possessing the greater geographical extension. But there are few grounds for comparison between the operations occurring in the air and on the seas. It may have been geographical factors that influenced England and the United States to specialize in the employment of air and naval forces. Aviation underwent an enormous development both as a combat weapon and a means of transportation. Sea forces, with their systems of transportation, and submarine and antisubmarine warfare, surface warfare, and airplane carriers, made an effort such as had not been seen since the introduction of the steam engine.

But, far from operating independently of one another, the ground, air and sea forces mutually provided support for one another in both strategic and tactical operations, amphibian, mixed, and combined.

In the Pacific theater, where the first operations on the scale of the future were carried out, aviation, sea forces, airborne forces, infantry, artillery and new inventions played an outstanding role in combined operations.

Thus arises the tendency to consider these factors, and even other activities such as national policies, diplomacy, education, etc., as constituent parts of a single organization to which the name of "army" would be applied, but which we here call "armed forces."

The distribution of national resources, occasional similarity of missions, and the advantages of cooperation, will gradually bring together or even unify these three arms as well as the means of production and transportation, and in the near future, even a "corps of war inventors."

With this unification, the role of air and sea forces will increase, especially in the case of countries possessing great expanses of terrain or water. The case of the United States shows that the augmentation of air and naval power and inventive capacity also increases the fighting power of ground forces. Greater aggressiveness with combat matériel will permit greater economy of the human element.

Only countries of definite economic power should give priority to the maintenance of powerful, well equipped and continually modernized air and sea forces. These will guarantee such countries, through domination of the air and sea, the best covering

force for alerting their war organizations. On the other hand, when well employed, they will be powerful instruments for their economic and industrial developments.

Command, Staff, and Auxiliary Agencies

The complexity of organization for war, and its concentration of means and coordination of effort, accentuate the tendency noted even in Napoleon's time of increasing complexity and importance of the organizations directing the military machine.

To make this machine operate, foresight, planning, organization, coordination, exercise of command and the checking of execution are necessary. This leads to the development of a group of auxiliary agencies with special functions, but whose principal purpose is to guarantee smooth and efficient coordination of effort.

Staff developments have not been, and will not be, confined to large troop units. They will extend to service and high command organizations. They will harmonize not only with the nature of the organization but also with the operations and services peculiar to each, and also with the personal system of the respective commanders. They will also be extended to civil organizations which join in the war effort.

But regardless of their complexity, all such developments must be evaluated by the study of results obtained, by coordination of effort, and by decentralization of tasks. Without this, the collective task is lost sight of. We should note the principal characteristics of this evolution. In the resulting system, the commander or leader is freed from material duties and enabled to concentrate on the more important task, the command of the unit as a whole. He may be a technician along general lines. In those military organizations characterized by energetic action, the command does not bind itself to the council chamber. It does not forget that it is the great animator, the impelling force behind the organization. It will exercise, thus, positive and vital functions, personally orientating subordinates, stimulating them, subjecting them to frequent inspections and improving the abilities of each. As a rule, commanders will not remain comfortably in the rear, but will serve in the lead.

Conventional Organizations

There are those who fear that the appearance of the new weapons of destruction will render classical military organizations obsolete, especially those of the ground forces.

First, there is the matter of whether the atomic bomb or other still more modern means will, or will not, be employed. It may be assumed that nations will hesitate, as Hitler did (in the case of chemicals), before employing means of such violence.

We must admit that, without failing to be prepared for the employment of such modern means, war will be waged along conventional, although technically improved, lines.

Moreover, there is nothing to prove that nations are not capable of continuing to resist, even after the annihilation of their large centers. The example of Japan, with Nagasaki and Hiroshima, cannot be generalized, because we must take into consideration the various means by which the effects of the atomic bomb may be lessened.

Also, the fact must be considered that if the belligerents should not have conventional forces at their disposal, but only new means of destruction, they would be in the position of two fortresses, limited to attempts to destroy one another with the fire of their cannon. In the end, it will always be necessary that one of the belligerents assault the enemy's stronghold. In whatever way victory is won, occupation will always be indispensable, and this will justify the necessity for standard military organizations.

Peacetime Organization

The picture presented by General George Marshall in the concluding paragraphs of his report on the victory in Europe and the Pacific, constitutes the best directive for military organization in time of peace.

Contrary to what might be expected, scientific warfare does not eliminate the necessity for men. The number of men required for these machines increases along with the machines themselves. For example, the air force, whose technological development has been greater than that of the others, required thousands of men for the fulfillment of its missions.

If all persons who are physically and mentally fit must be employed in war, as experience indicates they must be, it will be agreed that the military system should permit the utilization of these men on very short notice in order to be in accord with the speed of operations of the future.

Therefore, General Marshall urges a system of universal military training (not the old, universal military service), under which all citizens would be prepared for specific tasks in the event of war.

This system, whose aim is a reduction of the permanent force, possesses the advantage of harmonizing with peacetime economic capacities and of conforming to the democratic ideals of civilized nations. It is on this basis that the permanent forces would be organized.

We know that the organization of this force (ground, air and sea) has as its aim the attainment of maximum security with minimum expenditure of men and matériel. On the other hand, its efficiency must be absolute in order that it may instantly oppose the lightning-like attacks of undreamed-of projectiles and unexpected forces, until the other national resources are able to enter into action.

This principal mission makes it necessary that such a force be organized on a permanent war footing and quartered away from barracks in training camps, completely free from routine tasks. The plan is to make this a professional force of specialists and specially trained men engaged for a long term. This is what is happening, in part, with naval and air forces, whose technical characteristics necessitate a long period of service.

In addition to these elements, the permanent force must include: a high command and administrative corps from an advanced school of national security on down to the most elementary center for specialist training; special agencies for the training of reserves; and organizations for the recruiting and selection of the nation's manpower so as to be able to orientate and distribute it either for military activities or for industries and other public services.

Alongside this permanent force would be the civil armed forces whose aim would be to give the national service a strength never before anticipated. This armed force would, perhaps, be an organized reserve, not only military but covering all the other activities of the nation.

Thus, there would be three elements of the armed forces: (1) A permanent force for immediate employment; (2) command and training elements (command, staff, schools and services), also, in certain senses, permanent; and (3) the trained and organized reserves.

Of fundamental importance is the following: (1) That the whole of the permanent force be ready for immediate employment; and (2) that the reserves have complete and up to date organization and training fitting them for the conditions of war and the various tasks which may be required of them.

Social Aspects

In advanced countries, the citizen takes an active part in administrative activities and public life. He is interested in problems relative to security. He de-

sires and demands to be heard. His opinion must be considered for perfect understanding of the nation and its armed forces.

Participation of the citizen in the responsibilities of national security, of his own free will, creates new situations which must be considered, especially in countries of uncertain social development. Authority, subordination and discipline must be considered from the human and social standpoints. Mutual confidence between leaders and subordinates must be based on justice and on efficient moral and material assistance. The citizen soldier will require a type of treatment which harmonizes with his sacrifice.

The old adage that "the soldier is superior to weather," today possesses another meaning. The soldier must know how to face effort, discomfort and sacrifice when necessary, and for this reason his body and morale must be prepared and defended by good treatment. Far from being looked upon as a pariah, he will be, as has been the case in the armed forces of the United States, regarded as deserving of the best treatment possible from the nation. Arms and training alone did not win the war. The victorious soldier was also the best treated, the best uniformed, the best fed and the best supported from the morale point of view.

Let us not forget that "armed forces are an instrument of social perfection. But if discipline is not human and there is no personal assistance, they will become an instrument of social destruction."

Therefore, with the present tendencies, we must not neglect moral and social aspects.

Let us not forget, whatever the advances of science and industry, that victory is the fruit of human will and morale.

Moral force is the decisive factor in victory.

Air Attacks and German Economy

Translated and digested by the MILITARY REVIEW from an article in "Revista de la Fuerza Aérea" (Chile), October, November and December 1946.

IT is of interest to know the effects of the air attacks to the civil economy of the Third Reich. Here are some official accounts which give us a true picture of the consequences of such bombing on the economy of a leading industrial power.

During World War II, the German civil economy was subjected to direct air attacks by zone bombardment and, to a lesser degree, by precision bombing of selected targets. The former constituted attacks on civilians, as well as on their economy, housing, supply and maintenance stocks, distribution depots, transportation, communications, fuel and power, and factories producing goods for civilian consumption.

Besides direct bombing, there was what could be called indirect bombing of the civil economy. This was achieved by attacks on resources and on supply and transportation centers. The attacks on synthetic fuel plants, for example, decreased the production of fertilizers and consequently decreased the production of food supplies. Attacks on transportation reduced coal supply for home heating.

By destroying housing facilities, foodstuffs and clothing, the total labor output is considerably reduced, which handicaps the war effort. The destruction of industries and other essential civilian installations divert the war effort to the production of necessities.

Stocks in the hands of consumers re-

duce the effectiveness of these measures by the resulting dispersal, and the goods when needed may be distributed among the people suffering from bombing. Thus, the attacks should be directed towards the stored goods so as to exhaust them. Fuels are burned rapidly after purchase, therefore, their sources of production, storage and transportation should be bombed.

Civilian stocks are slowly depleted in time of war, because the needs are very much under the minimum peacetime requirements. On the other hand, the industries producing these goods are more dispersed than war industries which should be close to the sources of raw materials.

Although the German civil economy was not a principal target of strategic bombardment, the latter was responsible for the reduction of the German standard of living from 1943 to the end of the war.

After the outbreak of the war, the Germans rationed food, soap, clothing, shoes, tobacco and fuel, and restricted the use of furniture, utensils and bicycles. Production of merchandise not necessary to the war effort was gradually eliminated.

Large quantities of goods from the occupied countries strengthened the German economy. Yet, even with these measures, production was unable to reach normality under the stress of air bombardment.

While the military situation grew worse, industrial production designed for civil consumption had to be turned aside to meet the demands for military articles. On the other hand, many factories ceased operations completely because of the shortage of raw materials or labor. The quality of production decreased with the manufacture of synthetic products. As zone bombardment became more intensive, individual stocks were unable to keep pace with the standard of living. Furthermore, when a home has been bombed, the quantity of goods which had to be bought to replace that destroyed was equivalent to purchases over a period of several years. Naturally the demand was much greater than that authorized by the rationing system, and this in turn created new difficulties.

The critical year for the Reich was 1943. Almost six per cent of all housing facilities had been destroyed, and the rationing of clothing was practically suspended. The production of such articles as glass, cots and dishes was chaotic, and they had to be manufactured quickly to replace those lost by the bombing of homes. By fall, 1943, the situation had grown worse, because all inhabitants of the Reich were within the range of air bombardment. Early in 1944, the situation became acute because industry was unable to cope with production at the same rate that the latter was destroyed. The following paragraphs show the effectiveness of air attacks on different items of civil consumption.

Foodstuffs.—At the start of the war, Germany depended upon importation of ten per cent of her proteins, twenty per cent of her fruits and eggs, and forty per cent of her oils and fats.

With the occupation of neighboring countries, this situation was partially changed by obtaining fats and eggs from the Netherlands, and fruits and oils from France. This improved the supply of foodstuffs during the war, which, although insufficient in fats and meats, was superior to that of World War I.

As the war progressed, Germany experienced an increasing shortage in the supply of meats and fats, reaching fifty-four per cent of requirements by April 1945.

The domestic crop should have been allotted for human, rather than animal, consumption. Lack of calories produced by meats and fats was compensated for by an increase of potatoes, cereals and vegetables.

The minimum in daily calory requirements of humans is 2,000. By January 1945, consumers were getting only 1,721.

Of course, laborers and technicians were given an extra ration, amounting at times to 3,124 calories.

The bread situation was not serious, since Germany was self sufficient in wheat. Furthermore, wheat for flour was mixed with some barley in 1942.

In preparing for war, Germany built up a tremendous cattle reserve which was kept more or less stable during the war. The number of hogs was regulated to forage supply. But lack of forage reduced the supply of pork to fifty-two per cent by 1943, with most of the production being allotted to the army.

Production of fats and oils was the major headache of German supply. Germany depended on importation for forty per cent of its needs. With the war, the supply for civilians dropped down to fifty-seven per cent of requirements. Much of the fat had to be used to manufacture soap, which was reduced to less than one-third of the pre-war production. Further, milk consumption was severely curtailed in order to augment production of butter.

Fertilizers diminished as they were allotted for the production of explosives, but this did not affect seriously the crops, because of the good weather conditions.

Lack of spare parts for agricultural implements did not affect production, as most of the farms used animal traction and those mechanized had recently been supplied new implements.

Shortage of personnel was not felt, as foreign labor and prisoners of war were used as labor.

Although these factors might indicate enormous destruction of foodstuffs from air bombing, they actually did not constitute an effective threat to food supply in 1944. Mill industries in the Rhine zone suffered severe losses, but this was not serious, because of the size of this industry in other sections of Germany. The same was true of oil and fat industries in the Rhine, and at Hamburg and Harsburg, because fat stocks had been previously dispersed. Although the food production industry did not suffer serious losses, by the end of 1944 there were noticeable shortages of raw materials in agriculture, as well as difficulties in transportation, shortage of containers and a reduction in manufacturing potential. The destruction of food stocks by air attacks neither materially reduced the available quantities of foodstuffs nor affected the rationing system, although the latter was rapidly impaired by the end of 1944. This was due principally to destruction of transportation, which forced abandonment of a uniform rationing system for foodstuffs throughout the country.

It can be inferred that Germany was successful in holding her foodstuffs supply. This does not mean that the air attacks failed in weakening the situation, but it is necessary to wait for long range effects in this phase of economy. If the war had continued, the shortage of fertilizers, the destruction of industrial installations, and the loss of agricultural land in the East, would have resulted in severe shortages.

Clothing and Textiles.—By 1939 the textile industry of Germany was well prepared for war. It had fully recovered from the crisis of 1930 and the German wardrobe probably had reached its peak. Through development of synthetic fiber, the industry had been freed from imported raw materials and great progress had been achieved in reducing the number and standardizing the size of textiles at the factories. It may be said that there was an excess of production. The spinning factories were small but well dispersed. Only the handwork industry was centralized in the large cities, of which Berlin was the most important. When war began, the industry was placed under strict control. Pre-war standardization and simplification programs were widely spread and became more rigorous. Clothing was

strictly rationed and detailed programs for location of raw materials and control of finished quality goods were elaborated. The production of raw textile materials increased, until by the middle of 1943, it was approximately sixty-nine per cent above that of 1939. The major portion of this increase may have been due to the expansion in the production of synthetic fiber. Increase in domestic production was not sufficient to cover the shortage due to loss of imported goods of this type, and consequently the textile production declined with no serious effects on the civilian population until the middle of 1943. In fact, the existence of a uniform rationing system, together with price control, allowed everyone to improve his condition during the period. By the second half of 1943, the tactics in zone bombardment radically changed the situation. The principal effect of these raids was to increase the needs of the people of the areas bombed and to decrease the potential production of the spinning industry. After the raids on Hamburg in July and August 1943, for example, the demand on textile and handwork units increased to 200,000 monthly. By August 1943, it was necessary to discontinue the rationing of clothing and textiles, and permit purchases by persons with authorized purchasing orders only, and these were granted only on urgent need. By the end of 1943, handwork production was about one-third of the minimum needs, and it was not possible to cover the demands of the people in bombed areas.

Centralization of the spinning industry in the largest cities made it a continuous target of zone bombardment, thus diminishing its productive capacity. At the beginning of 1944, for example, about eighty per cent of the dress manufacturing industry at Berlin had been destroyed, and prior to this bombardment, Berlin accounted for eighty per cent of production in Germany. Heavily bombed cities as Stettin, Aschaffenburg, Frankfurt, Munich, Stuggart, Breslau, Essen, Chemnitz and Magdeburg were important centers of fabrics and dresses.

After the middle of 1944, production of fabrics and dresses followed the general pattern of economic disintegration. Raw materials and production were continued through September, but decreased forty per cent from September to December. All items in the production of clothing equipment in 1944 were of about one-third less than in 1943, and the rate of decrease was higher in the last quarter of the year. Shortage of coal, power and raw materials rapidly forced the industry to collapse.

Leather and Shoes.—Sole leather was a critical item during the war. Domestic production was maintained, but imports showed a noticeable letdown. At the end of the fiscal year 1944, imports were only twenty-four per cent of the disposable total as compared with forty-eight per cent at the end of the fiscal year 1939. By increasing production of leather substitutes, the total available leather and its substitutes in the fiscal year 1943-44 was slightly nearer that of 1938-39. Leather substitutes comprised thirty-seven per cent of the 1943-44 supply, and fifteen per cent of the 1938-39. The Army had the shoes and leather which it needed until the end of 1944, when production declined abruptly. The Army used 2.6 times more leather in 1944 than in 1939.

There was no shortage of shoes for civil consumption during the war, but most shoes were made from synthetic materials. Civil consumption of leather and substitutes for manufacturing and repairing shoes descended to fifty-five per cent in 1944. Civilian consumption represented only twenty-eight per cent of total consumption in 1944 as compared with sixty-four per cent in 1939. To give an idea of the quantity of leather substitutes, it may be noted that the production of wood-

en shoes increased from 234,000 pairs in 1938, to 2,600,000 pairs in 1943.

General economic disintegration, which began at the end of 1944, was reflected in the rapid letdown in shoe production. Although the leather and shoe industry did not suffer directly, the injury done to distributors' stocks and the facilities of production caused considerable damage, especially in the cities which suffered heavy bombardment. The geographical dispersion of the factories helped greatly in decreasing the overall damage.

Habitation.—Nearly 400,000 residential buildings were destroyed and 415,000 seriously damaged during the war. This represented twenty per cent of Germany's lodging units and fifty per cent of the lodging units of the cities subjected to heavy bombing attacks. If half of the houses seriously damaged were unfit for habitation, it can be estimated that fifteen per cent of the houses in Germany were destroyed. About thirty per cent of the buildings were destroyed or heavily damaged in 1943, forty per cent in 1944 and twenty per cent in 1945. Losses of dwellings were irreparable, and as a result of the raids there were 375,000 dead and 625,000 wounded, of which eighty-seven per cent were civilians.

Devices for Domestic Use.—The production of household devices was rapidly decreasing as a result of the increasing shortage of trained operators and the lack of raw materials. Lists of articles authorized for purchase were prepared. Items which were not on the list were prohibited, including refrigerators, electric heaters, radios, watches, eye glasses, cameras, electric stoves (except small ones), leather bags, leather shoes (except for laborers employed in hard labor), 100 per cent wool goods and glassware. In this manner, the supply of devices for domestic use was largely reduced. Production of some non-essential items was continued by such devices as the granting of special authority as to maintain exportation quotas, for such items as glassware, leather articles, etc.

Large quantities of these items were destroyed by air attacks thus increasing the demands of the people suffering from bombing. In 1944, the full production was absorbed by them and during the last stages of the war, exclusively by them. Only those holding certificates to show that they had suffered losses by air attacks could buy. Designs had been simplified since 1943, and were of such inferior quality that consumers avoided buying kitchen utensils, for example. Production along these lines was conducted principally to supply kitchen utensils, dishware, cots, chairs and tables to people who had been bombed. This industry suffered immensely because of transportation difficulties and had the lowest priorities. Shortages of coal and raw materials also aided in the collapse.

Tobacco and Printing Material.—With reference to tobacco, cigars and cigarettes, it can be said that the raid on Dresden destroyed eighty per cent of this industry.

There was a paper shortage throughout the war because of the competition of the textile industry for raw materials. The air raid on Leipzig greatly crippled the printing industry.

Conclusions.—By the end of 1944, German civil economy was dislocated due principally to the lack of transportation to carry consumer goods from the factories to the consumer. Many factories had to close because of the shortage of coal, and home heating was curtailed throughout the country. Dwelling facilities were reduced because of evacuation of lost areas. Although clothing was delivered to persons whose homes were bombed, supplies were insufficient to cope with these minimum requirements. Food rationing, in general, was adequately maintained through 1944,

but in the spring of 1945 uniformity in rationing was not possible. It can be concluded that the damage to the civil economy by air attacks was not the cause of the German military collapse, but undoubtedly air attacks reduced to a large extent the goods stocks of the consumers, thereby preventing the conversion of factories to production of war products during 1944. To some extent, this aided in intensifying the effects of the air attacks on other objectives. If war had continued, the basic needs of the civilian economy would have forced the diversion of production from war to civilian needs. It can be concluded that the attacks on the civil economy were of such a nature that their effect was a matter of time, and that the war against Germany ended before its maximum impact had been felt.

The Radio War

Digested by the MILITARY REVIEW from an article by Air Vice-Marshal E. B. Addison in "Journal Royal United Service Institution" (Great Britain) February 1947.

ALL three services, not only of our own armed forces but also those of our Allies and enemies, made extensive use of radio (including wireless and radar) during World War II, but here we will be concerned almost exclusively with its application to air tactics, particularly of night bombing, and the methods we adopted to restrict the advantages that our opponents could gain from its employment.

Radio in the late war had three main applications. The first is the extension of normal listening range for communication at a distance. The second is the extension of the human visual faculties as regards both range and penetration. The third is its employment as an aid to air navigation and blind bombing.

The scientists and engineers were not long in finding uses other than signalling for radio. They discovered, for example, that by its means they could "see" aircraft up to distances of some hundreds of miles, or watch the ground beneath them when flying in the dark or above clouds. They found, too, that they could provide the fighter pilot with an "electric eye" with which he could see his opponent on the darkest night. This property of being able to "see" by means of radio has become a very important tactical factor, particularly in air warfare.

The use of radio as an "electric eye" is a product of that branch of science which we now term "radar." The basic principle of radar is the emission of pulses of electric energy and reception of the reflected pulses after a calculable time delay. From a knowledge of this time delay, and by the employment of a means of direction-finding in both horizontal and vertical planes, it is possible to fix the position in space of the reflected object.

By this method we were able to detect the presence of approaching aircraft and, eventually, as the art developed, to estimate the speed and direction of approach of well as the number, and sometimes the type of aircraft. Thus, with the erection of a chain of stations around this country it became possible for us to gain early warning of the approach of enemy raiders. Later, a further development enabled us to detect in much the same way the presence of surface craft.

Evolution of Radio Warfare

It was inevitable that the employment in war of radio in all its ramifications was not likely to remain the monopoly of one side only, particularly in a conflict

between great powers whose scientific attainments were of comparable standard. It was just as inevitable that the one side would attempt to deny to the other the tremendous advantages that radio was now capable of bestowing upon its user. Thus arose the necessity for the introduction of organized radio counter-measures whose initiation launched the Radio War or, if you prefer it, the War in the Ether.

Realization of the seriousness of the problem was first made by ourselves in 1940, when it was discovered that the enemy intended to use against us methods of radio-aided navigation and blind-bombing which would enable him to raid us by night at a time when our air defenses were not sufficiently developed to ward off such attacks. So it was, in the face of dire necessity, that we first conceived the idea of RCM—Radio Counter Measures—an organization which grew into an immense system involving the absorption of great resources of manpower and equipment and the devotion of much scientific and engineering endeavor.

The Radio War promoted much controversy. The idea of jamming wireless communications was by no means novel, but it was a generally accepted principle that there was more to be gained by not inviting interference with our own communications by deliberately jamming those of the enemy.

This viewpoint was maintained in principle by both sides throughout the war, and no large-scale attempt was made by either to jam the opposing main radio communications systems. From the inception of radio counter-measures, this fear was always uppermost and every new proposal was closely examined by our Inter-Service Board, one of whose most important duties was to prohibit the use of any counter-measure that they considered likely to precipitate a general jamming war. Methods had, therefore, to be devised which, while interfering with the enemy's means of air navigation or control of his aircraft would, at the same time, be sufficiently subtle to obviate his considering them as an excuse for embarking upon wholesale jamming as a reprisal.

Defensive Phase

One of the most successful of these was the system that we introduced in 1940 for preventing the enemy from making full use of his medium frequency radio beacons of which he had installed a large number along the coasts of Holland, Belgium and northern France. For this purpose we set up in England a number of stations at which the beacon signals were received. The received signal was fed into a transmitter which was thereby caused to radiate a signal identical to that of the German beacon. In short, the enemy signal was used to start our transmitter. Since all the signals were in exact synchrony, the German direction-finder was unable to give him an accurate response.

The Germans were not long in discovering this trick and gave instructions that, in cases of doubt, the crew of an aircraft were to transmit from the air, and they would be told their position by radio. We countered this by causing the German aircraft signal to start ground stations in this country. As a result, German aircraft were often given fixes over this country which were entirely false.

An even more dangerous practice that the enemy resorted to at this time was the use of long-range navigational beams. The German pilot would fly up one beam and drop his bombs at the moment of passing over the point of intersection of another. It was estimated that, by this method, bombs could be dropped with an accuracy of about 500 yards at 200 miles range without the pilot ever having to see his target or having to worry about navigation once he was on the director beam.

Our method of countering this system was to emit dashes which sounded exactly like those of the enemy's beam transmis-

sions. These were not synchronized with the German signals, but were superimposed upon them. When in the dash zone, the enemy pilot would turn in the required direction, but on arrival over the central lane would still hear predominating dashes and so would tend to overshoot. When in the dot zone, he would hear a mixture of dots and dashes, which would not resolve themselves in the expected manner when he applied his rule of thumb.

A curious feature of this operation was that the enemy believed we were deviating his beam. This idea became prevalent among German bomber crews, and soon it became obvious that frequently such a phenomenon was, in fact, being produced. We therefore made use of this effect to our advantage by installing decoy fires around the more vital targets in this country. On some occasions, these decoys were very successful, indeed, in diverting the central point of the enemy's attacks to open country a short distance from their objectives.

The underlying principle of a new German beam was similar to that of the old, but it was of greater accuracy, and on a higher frequency. Being on a higher frequency should have made it even more improbable, according to theory, to detect it on the ground but, here again, theory failed and we found we were able to plot it as before. Its use was, however, confined to a single highly-trained specialist unit who acted as Pathfinders to the rest of the forces. Their duty was to mark the target and, if possible, start fires in the target area to serve as a luminous guide to the main body—such as our own pathfinders did towards the end of the war.

Our method of countering these new beams was very similar to that employed against the old, but had to be on a very much more extensive scale. Actually, seven beams were normally used at a time against a single target. Before we were fully ready with our counter-measures, the Germans made very successful use of this system, but gradually, like its predecessor, it fell into mistrust as our countering methods became more effective.

The Germans then introduced another system in the form of an entirely different type of blind-bombing device. This consisted of a single beam which was directed over the target and along which the bomber flew. During this process the aircraft was caused to emit signals at intervals which enabled the controller on the ground to estimate accurately its exact position along the beam. When the bomber arrived over the target, the ground controller gave the aircrew the order to bomb.

But this device also suffered interference at our hands although we had some difficulty in determining the principles on which it worked. Moreover, by now, our air defenses had got into their stride and were beginning to take heavy toll of the invaders.

Offensive Phase

The second phase of the Radio War, that is to say, the offensive phase, came into being when it was realized that the defensive system of the enemy was becoming so efficient as to inflict losses on our night bomber forces. We were now on the offensive and the Germans were sinking all their resources into the building up of the air defenses of their territory. Their defensive organization depended for its success to a very large extent indeed on the use of radio, and on the rapid strides made in this art by the German scientists. Bomber Command was meeting increasing opposition as its attacks grew in intensity. The Germans were able to gain very early warning of an impending attack and could congregate his fighters well beforehand in the right area and so be ready to inject them into the bomber stream as soon as it arrived overland.

A knowledge of the methods that the Germans were using enabled Bomber Command, however, to route their aircraft in

such a manner that the danger from radar was lessened to some extent. For example, it was found that concentration in time and space caused saturation of the enemy's radar. Again "zig-zag" routing made it more difficult for the enemy to guess the probable target by observing the general trend of approach.

But the enemy was quick to re-adjust his defenses to meet every new contingency as it arose. Eventually, it was concluded that specialist RCM aircraft and escorting night-fighters, fitted with special devices for searching out and destroying the opposing night-fighters were needed. Thus, it was decided, late in 1943, to form a separate group within Bomber Command, whose main function would be the protection of our bombers at night.

In the meantime, Bomber Command obtained a very welcome respite by the introduction into operational use of one of the simplest and yet most successful counter-measures of the war. For many months previously, we had known that strips of metalized paper when cut to the right dimensions would cause spurious echoes on the German radar apparatus. If, therefore, sufficient quantities of these strips could be thrown out by our bomber aircraft while within range of the apparatus, the German fighter control and antiaircraft radar systems would become cluttered up. The sudden introduction on a large scale of this device completely took the Germans by surprise, and for a considerable period had the effect of greatly reducing our casualty rate.

However, by now, the new RCM Group was rapidly taking shape and as its strength and skill born of experience grew its existence began to make itself felt.

The new group had three main functions: first, it provided aircraft to accompany our bombers for the express purpose of interfering with the German radar and ground-to-air radio-control channels; secondly, it furnished night-fighter escorts; and thirdly, it employed aircraft for search purposes with the intention not only of checking how effective were our counter-measures, but also of discovering what new radio devices the enemy was using.

The aircraft employed were four-engined bombers and long-range night-fighter Mosquitoes. All were packed with a mass of apparatus, much of which had to be specially designed for the purpose. The Mosquitoes, in particular, carried "black-boxes" in every possible available position. These enabled them not only to home on to the German beacons over which the enemy night-fighters used to assemble, but also to home on to the radio apparatus which the German night-fighters carried for intercepting our bombers.

During 1944, as the value of the operations of the new group became more apparent, it was increased in strength until eventually it comprised as many as fourteen operational squadrons. For the first time, it became possible to devise many ingenious new forms of operation with the intention not only of destroying enemy night-fighters, but of diverting them from our main bomber force. For example, it was found possible by the use of "window" to cause a handful of aircraft to simulate a force of several hundreds. Thus we were able to mount decoy raids simultaneously with those of the main force.

Another effective method was to employ "spoof" aircraft in such a way as to give the appearance of the main raid splitting before reaching its target. The enemy would see on his radar a large force of aircraft approaching whose head would suddenly divide into several prongs, each of which pointed at a vital objective. He now had to guess which of these prongs constituted the real menace.

Yet another method was to infect an immense area with "window" just before the main force was due to arrive. This was done by the "spoof" aircraft preceding

the main force by a short distance and then fanning out as they approached the target area, "windowing" hard as they did so. The main force on arrival would then disappear into a cloud of "window" and, until the bombs started to drop, the enemy could not determine the actual objective.

By methods such as these, we succeeded not only in partially blinding the enemy but in turning his defective vision to our advantage by laying him open to deception. In this we were eventually aided by his evacuation of France and the Lowlands, since not only had his early-warning system to be drawn back but we were able to supplement our airborne RCM by a ground system deployed on the Continent which we pushed up close behind our front line. One of the various ground counter-measures that we employed during this period was the transmission of false instructions to the enemy fighters. We employed German-speaking operators to countermand the instructions given by the opposing controllers, or to give warnings to the German fighters of bad weather and other impending terrors.

Incidentally, this operation exemplified a principle which is of paramount importance in radio warfare—the necessity of continuously appreciating what the other fellow is likely to do next. We imagined that, if our "ghost voice" was successful in causing trouble, the Germans might well employ a woman controller. Consequently, when training our male "ghosts," we took the precaution of simultaneously training two women. Sure enough, one evening during a particularly hectic exchange of opinions between the German controller and our "ghost" a woman was suddenly heard to take over control on the enemy side. She was immediately taken to task by our duty female "ghost" who, for many nights, had been eagerly waiting for just such an opportunity to have her say.

The net result of all these operations was that our night bombing was able to continue with an ever-decreasing casualty rate.

The experience we gained in the use of the various counter-measures was turned to very good account by Bomber Command and the Navy during the Normandy invasion in 1944. Not only were we able to blind at will the remaining German early-warning systems, but also to simulate landings and attacks by air and surface craft in sensitive areas in which no invading forces were actually employed.

The Germans were very much less advanced in their counter-measures than ourselves. It transpired that they did not fully appreciate the immense advantages to be gained from the use of this weapon until late in the war and, by then, all their RCM resources had to be devoted to endeavors to make their defensive apparatus proof against our counter-measures, or to devise entirely new apparatus which they hoped would take us a long time to counter, and so give them a breathing space.

The Future

The late conflict has pointed in no uncertain manner to the likely trend of weapon development in the next war—a struggle in which the product of the scientist's brain is likely to play an even more predominant part than we saw during 1939-1945. Perhaps among the most important of these developments will be the production and employment of remotely-controlled lethal weapons capable of travelling immense distances at great heights and at speeds hitherto unattainable; capable also of being aimed with a very high degree of accuracy and of being armed with explosives, small in size but of tremendous destructive power.

It is possible that present methods of defense would be incapable of dealing with weapons of this nature, but it is by no means certain that effective counter-measures could not be found for use against them. On several occasions during the late

war I heard the belief expressed that some form or other of new apparatus was so intricate that it could not be successfully countered. Rarely, if ever, were such conceptions eventually found to be true. The danger lies in concentrating effort on producing a weapon to the exclusion of simultaneously working on methods of countering it or nullifying its effects. Often production of the counter-measure may require more effort and more time than the perfecting of the object to be countered. If the result of a future war, consequent upon the production of new lethal weapons, is likely to be swift and decisive there will not be time to invent and produce counter-measures once hostilities have started. They must be prepared beforehand. There is a danger—a likely danger now the war is over—that scientific effort may be wholly directed to the production of bigger and better weapons, and so leave none available for what, in my opinion, should be the equally important task of inventing methods of countering them—and perhaps, who knows, in the next war we shall not have time to spare before coming to actual blows.

French Military Aviation

Translated and digested by the MILITARY REVIEW from an article by General L. M. Chassin in "Forces Aériennes Françaises" (France) May 1947.

WHAT is the present state of French military aviation? Many Frenchmen are asking what forces we have, and some believe that we have almost nothing. While the more informed think of the problems of Indo-China, the schools, and the troops overseas, very few are acquainted with current difficulties and the enormous efforts that were necessary to maintain our effectiveness from the end of the war until the consolidation of our Armed Forces.

These efforts will soon give us French equipment of a new pattern, worthy of the world-wide reputation of our engineers and pilots. From the point of view of personnel, we have a strength of about 61,000, with the promise of priority in obtaining more. This should bring our force theoretically to 84,000 men at the end of the year if budgetary difficulties permit.

Those 61,000 are composed of approximately 5,000 officers, 25,000 noncommissioned officers, 30,000 enlisted men and 1,000 women.

Since aviation is an army of specialists, it should have nearly as many noncommissioned officers as enlisted men.

At present, we have twenty-nine general officers, about 650 field grade officers, and 4,400 officers of company grade. This shows that the Air Force is particularly deficient in the field grades. Indeed, if we compare air figures with those of the Navy, we can make some observations that are not without interest. While the Air Force numbers twenty-nine officers of general rank, the Navy numbers fifty-nine. There are fifty-eight colonels to 153 captains or the like, 148 lieutenant colonels to 325 commanders of frigate, and 442 commanding officers to 634 commanders of corvette.

It is not intended to criticize these figures, which are favorable to the Navy, even though it is said that the Navy has the best management of personnel in the world. It is only a matter of establishing precise facts and of destroying the legends from which the Air Forces have suffered and from which, unfortunately, we still suffer.

It is also good to observe the fact that to have many generals and colonels permits officers of rank and seniority to be

placed in the Combined Great General Staff, which will without doubt be increased in the future.

The Navy has only 2,975 officers of company grade while we have 4,400. The total number of Navy officers is therefore now 1000 units below the Air Force. This poses the difficult problem of the correct and regular promotion of such a body of officers.

While the personnel figures on the Air Force are well known, matériel figures are less known. Here too one should correct a misinformed public opinion.

We have seriously changed the structure of our Air Force of 1945 by dissolving our medium bomber groups and by heading toward a defensive establishment from a pursuit and transportation basis. Despite difficulties, we have maintained the number of our aircraft due to agreements with our Allies, purchases under "Lend Lease" law, the agreements of Blum and the output of our repair shops and plants. We have maintained our aircraft at 3,700, about the level at the end of the war. This is not so bad considering wear and tear, breakage, and accidents.

Apart from the schools, whose activities deserve to be emphasized, the Air Force of 1947 numbers twenty-seven groups in training. In 1946, it had 277,000 flying hours, transported 200,000 passengers, granted 8,000 air licenses, and flew more than 2,000 flying hours for the benefit of the national economy or aviation sport. Comparing the balance of our transport groups with all French commercial companies, we have the right to be extremely proud.

We have transported, in spite of limited personnel and matériel, two-fifths of all passengers (200,000 to 300,000 civilians) and flown 200 million to 340 million passenger-kilometers. Also we are well established in kilometer-tonnage.

As to accidents, our transports enjoy an established and deserved reputation for safety. The efforts of the Air Force in the present difficulties in Indo-China are worthy of praise, and our comrades of the other arms of service, especially those of the garrison Nam-Dinh know what they owe to our air men. Many heroic epics have been unfolded on our 10,000 kilometer front. The country should know that the Air Force has fulfilled its tasks.

It is hoped that the government and Parliament will give the Air Force the position which belongs to it in the military balance of the country—matériel first, then men and money.

In a country with compulsory military service the officer has a sacred mission to fulfill. The intelligence of the masses, which is much more developed than in the past, will permit him, in the hour of danger, to find capable assistants among the better elements of his forces.

A Defesa Nacional (Brazil)

Carrier Aircraft in Support of Major Landings

Digested by the MILITARY REVIEW from an article by Rear Admiral G. N. Oliver in "Journal Royal United Service Institution" (Great Britain) February 1947.

FOR many centuries wars have been fought in two elements—the land and the sea; and during the centuries, we in England—a maritime power—have learned the absolute interdependence of the soldier and the sailor in our national strategy. Man's conquest of the air introduced this third element in and from which war may be waged; and, since air is present alike over land and water, the airman has become equally interdependent with the soldier on land and with the sailor at sea. Today, neither the soldier nor the sailor can fight—or at any rate fight for very long—without the airman, neither can the airman operate from airfields without military forces to secure them, nor from aircraft-carriers at sea without the fleet.

During World War II, an army in the field was ever accompanied by its tactical air forces—a portion of the Royal Air Force specialized in the tasks of land fighting. Afloat, too, the Royal Air Force performed a like function with and for the Navy. The later years of the Battle of the Atlantic provide the fullest example of such cooperation. But, where geography and circumstances are unfavorable, that is to say in waters outside the effective operational range of our land-based fighter aircraft, the fleet must carry its own aircraft with it and operate them from the flight decks of its carriers; and that goes for a very large proportion of the sea surface of the world.

All this sounds very obvious now. It was well appreciated and had been the subject of much thought, planning and training before 1939. The bitter experiences of Norway, Crete and Singapore served to drive the lesson home of the interdependence, at all levels, of the soldier, the sailor and the airman.

I believe, however, that it is fair to say that the provision of naval air support for a military force had received far less attention, and by 1939 we had many other things to think about. So it came to pass that the use of naval aircraft in support of military operations grew up as the war proceeded. By 1944, it had become an accepted role of naval aircraft to cover and support landing operations during those stages of invasion when the Royal Air Force was geographically unable to do so. In fact, a long range assault is now usually defined as one which cannot be covered or supported by land-based aircraft.

Carrier aircraft first gave a measure of support, mainly indirect, to our land forces during the invasion and evacuation of Norway during April and May 1940. Three carriers took part: the *Furious* in the north off Narvik; the *Ark Royal* and *Glorious* farther south, off Aandalsnes and Namsos. Besides fighter and antisubmarine patrols and shipping strikes, land targets were attacked and a squadron of Royal Air Force Gladiators was conveyed and flown off to a temporary landing ground on a frozen lake. The carriers operated far to seaward and, very soon, the enemy's air strength began to make it impossible even to maintain this distant operating position. We were hopelessly outnumbered both ashore and in the air; and with the evacuation, the operations were brought to a close.

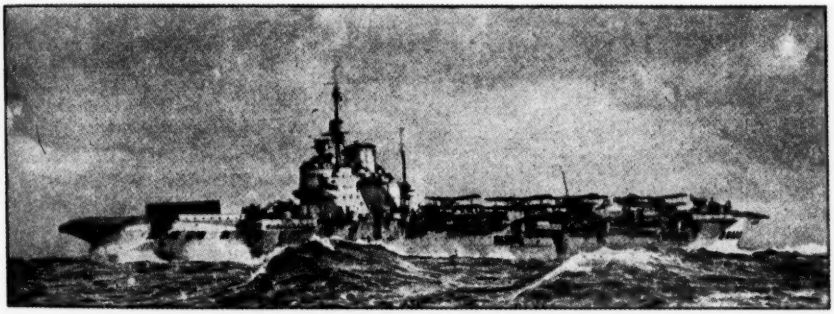
It was not until May 1942—two years later, that naval aircraft next acted in support. The seizure of Diego Suarez, in Madagascar, was covered and supported entirely by aircraft from the *Illustrious* and *Indomitable*. Besides their primary function of providing fighter cover, naval aircraft carried out spotting, tactical reconnaissance and ground strafing. The

operations were successfully concluded within three days.

In this operation, bombing and strafing were insignificant compared with the moral effect of our air superiority. The chief lessons learned were, by the Navy, how much remained to be done to equip ourselves fully to pass on to the troops the benefits of our new found air superiority and, by the Army, how much more the air could do to help them than they had ever expected.

In the following November, 1942, carrier aircraft operated in support of the triple landings in North Africa, which may be fairly described as the first major seaborne assault of modern times. The landings at Casablanca were supported by American naval aircraft; those at Oran, in the center, by the *Furious*, *Biter* and *Dasher*; and those at Algiers, by the *Victorious* and *Formidable*. The plan called for little tactical support of the Army, since it was judged—correctly—that opposition would be slight. So the naval air task was mainly to cover the assaults from enemy air attack. This operation saw the first appearance in any numbers of what was later to be the naval Seafire fighter aircraft. The rapid enlargement of the beachheads, the absence of any large scale enemy air attack in the early stages of the invasion, and the timely capture of airfields enabled shore-based aircraft to fly in before dark on D-day. Some signs of the possibilities of naval aircraft in direct support were afforded, however. Albacores were called on to bomb several forts that resisted the advance of our troops. An enterprising Seafire pilot landed beside an American tank column and offered his services for reconnaissance, which were gratefully accepted. The airdrome at Blida, not far from Algiers, was captured by a pilot of a naval Martlet.

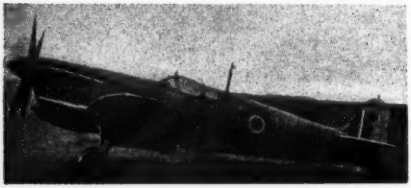
The next invasion campaign that followed in the summer of 1943 was the capture of Sicily. On this occasion, naval aircraft accompanied Force H, covering the movements of the invasion convoys against the Italian Fleet, but took no part in the assaults, nor did they cooperate with the land forces or the bombarding ships.



HMS Victorious.

The capture of Sicily paved the way for the assault at Salerno, early in September 1943, with the immediate object of seizing Naples. Salerno was very near the extreme useful range of shore-based fighters operating from the north of Sicily. It was this factor, among others, that influenced the selection of the Gulf of Salerno in preference to the Gulf of Gaeta, farther north, as the objective of the expedition. Spitfires, working from Sicily, could remain twenty minutes in the assault area; P-38s (Lightnings) one hour.

It was aimed to maintain a force of twenty-four Lightnings and fifteen Spitfires continuously over the assault area during daylight. But these aircraft could not be replaced in less than about thirty minutes if they became engaged in combat and were forced to jettison their long-range tanks. Ship-borne aircraft were therefore the only aircraft that could be relied on to meet waves of enemy aircraft attacking in quick succession. It was accordingly decided to augment the shore-based fighter cover with naval aircraft, and Force V, consisting of the escort carriers *Unicorn*, *Battler*, *Attacker*, *Hunter* and *Stalker*, was constituted and hurriedly trained for the job. To have the maximum number of ship-borne fighters



Seafire II C Fighter.

available to cover the beaches it was necessary that the fleet carriers of Force H—the *Illustrious* and *Formidable*, should provide the fighter cover for Force V.

The assault plan assumed that Monte Corvino airfield would be captured on D-day and put into operation for shore-based fighters on D+1. Force V was, therefore, only intended to operate for two days. There was, however, delay in securing Monte Corvino and, even after its capture, it was under artillery fire from the neighboring hills. So airstrips had to be constructed nearer the beaches, and Force V had to operate for three and one-half days. During that period, Force V flew an average of 220 sorties a day, maintaining an average patrol strength of seventeen aircraft in the air throughout the day. Before withdrawing, Force V flew off twenty-six aircraft to operate from the strip just behind the beach at Paestum.

In this operation, naval aircraft were used to provide day air cover over the assault area. Close support of the troops was the task of the shore-based fighters; but, because of the great distances of their bases, there was inevitably a considerable and unacceptable delay in answering calls for support. The lesson was clear: the provision of close support as well as air cover must be a naval task in the long range assault. To meet impending requirements, therefore, selected naval fighter squadrons were trained in the many tasks of close support. The choice of fighters rather than any other type was natural, since air superiority had first to be obtained before any secondary role could be fulfilled.

Invasion of South France

It was in the invasion of the South of France in August 1944, that we really find a fully specialized and completely equipped Naval Air Support Force. The force for this operation consisted of seven British, together with two American escort carriers, each carrying between twenty and thirty aircraft. In addition, shore-based aircraft, chiefly American, supported the invasion from Sardinia and Northern Italy. Time was available to train the two groups into which the carrier force was divided and some of our squadrons were attached to the 2d Tactical Air Force in Italy for practical experience beforehand.

The shore-based Air Force Commander, under whose orders the force operated, had no previous experience of carrier-borne aircraft—at first sight the number of aircraft available in a carrier force appears, on paper, to be very small; they gain their effect by the mobility of their parent ships and by their ability to operate close in shore. He found that he had at his disposal, not only an unexpectedly powerful and efficient air support force, but one that

was capable of answering any call at the shortest notice.

As originally planned, the principal naval air tasks were reconnaissance, bombardment-spotting, and beach cover. The number of aircraft available, however, after these commitments had been met, allowed, thanks to the almost complete absence of enemy air opposition, for a heavy program of fighter-bombing and ground strafing. Full advantage was taken of this. The amount of destruction wrought on the enemy's communications was impressive and proved an important factor in the rapid advance of the Army from the beachhead.

The valuable mobility of carrier-borne support was illustrated when the "train" of the 11th Panzer Division was reported to be near the Franco-Spanish frontier, retreating to Toulouse. A carrier group was detached to attack this division from a position off the Spanish coast. Assiduous search failed to reveal any tanks, but a considerable amount of motor transport and other minor game was found lurking in cover, and flushed.

In this operation, from dawn on D-day until dusk eleven days later, Allied naval aircraft provided continuous air support throughout daylight hours. Many lessons were learned; the need for rest periods, both for aircrews, ground crews and commanding officers and other key officers; the need for reserves, both of aircraft and pilots; the need to keep close to the beaches to reduce transit times. The tricky navigational problem of maintaining a carrier group in position while turning into the wind every twenty-five minutes or so dictated a convenient maximum of four carriers in each group and a circular destroyer screen. An exactly similar formation was evolved independently by the United States Navy in the Pacific.

With this operation, as with those American operations that were taking place about the same time in the Pacific, naval air support may be said to have definitely arrived.

In the Pacific campaign, the United States Navy used carrier-borne air support on an ever increasing scale, and their island-hopping advances relied upon it entirely. The technique they evolved was identical to ours, but their greater carrier strength permitted a very much larger effort than we could develop, and introduced a number of interesting technical problems of communications and control.

Aircraft of the British Fleet did not at any time give close support. Their role, until the collapse of Japan, was more strategic than tactical. During the Okinawa assault, the British forces were occupied chiefly with the interdiction of the Sakishima Gunto airfields, thus covering the left flank of the assault. Operations proceeded for fifty-four days, and many of the problems were similar to those met by a force of support carriers.

It is absolutely essential, from the very start of planning any operation, to have the proper structure of command. In a long range assault, a senior naval officer is usually appointed as Air Commander on the staff of the Naval Assault Force Commander. At the same time, a Royal Air Force officer is usually appointed as Air Commander (designate), in readiness to take over from his naval *confrère* when the Royal Air Force build-up in the assault area has sufficiently advanced. When this stage has been reached, the former Air Commander may become Assistant Air Commander (Naval) until the withdrawal of the Carrier Force. The duty of the Air Commander with the Assault Force is to interpret and translate the air requirements of the assault into requests for missions to the carriers, or to the Royal Air Force units concerned.

The assault carriers are generally commanded by a flag officer, who acts as a sort of garage keeper, supplying the needs of the air commander so far as he judges

that he can do so with the forces available to him and according to the circumstances of the general situation. He may himself tactically operate one of the carrier groups; otherwise, tactical command may be delegated to the senior officers of groups.

It is vital to success that the air commander and the flag officer of the carriers should plan and work with the naval and military assault commanders and with the Royal Air Force from the very start. These commanders must be absolutely *en rapport* with each other's intentions and with every phase of the operation. It is particularly necessary too that the training of the naval support squadrons should be coordinated with the plan from the very beginning.

Second only in importance to the set-up for command are the communications. They are based on speed rather than security and, nowadays, consist almost entirely of radio-telephony. The communications at the military end must, of course, be mobile; as also should be those of the air commander who must, in due course, proceed on shore with the military commander. But they must also be reliable, although mobility and reliability together are sometimes unwilling partners in wireless sets.

Training and time for training are also essential. Training works up to piecemeal and perhaps eventually complete rehearsals; and these are well worth the extra flying hours and the extra maintenance involved. But whatever is or is not rehearsed, a complete rehearsal of the communications should be insisted upon, including every line—naval and military, however insignificant.

We have seen that one of the most valuable characteristics of naval air support is mobility. It is well not to forget this in the planning and training stage. Intelligence must distribute maps widely. Much time will be saved in briefing if the airmen already know their country like a book, and ways and means can be devised to maintain security. Maps must cover the widest possible area, otherwise a flanking or diversionary move by the carriers may find them "off the map."

In good ethics, and always within modern ideology, the army officer, should not only be the defender of the independence and his country's institutions, but also a real teacher setting an example to his people. Formerly his character was exclusively military, at present, it has become eminently educational. The officer must not only be competent to instruct the recruit in the use of his weapons, inculcating in him at the same time noble patriotic sentiments and discipline, but he is also required to demonstrate to each citizen that every soldier fulfills a cultural role of the greatest importance for the future of his country.

Fernando Lera in "Orientación," **Uruguay**

Use of Infra-Red Equipment

Digested by the MILITARY REVIEW from an article in "Journal Royal United Service Institution" (Great Britain) May 1947.

SOME details of the use of infra-red rays for a variety of operations in the late war have now been made public.

Admiralty research scientists, who had studied infra-red rays since the last war were given the task of developing and applying to military use all available knowledge. No time was lost. British Research Laboratories developed, in a few months, an infra-red sensitive cell suitable for military use, and this element was used in instruments for the many different applications. One problem was to supply a voltage of 3-4,000 volts. The normal system of using a vibrator power unit was developed and used successfully wherever it was possible to accommodate the weight and size involved, and many equipments were supplied with this type of unit.

An ingenious solution, however, was found to the problem of a 3,000 volt power supply where lightness and compactness were of paramount importance. Early in 1941, the development was completed of a dry pile based on the century-old work of a Swiss priest, Abbe Zamboni, which had not previously had any practical application. The battery, called a Zamboni Pile, is made from small discs of paper coated on one side with manganese dioxide and on the other with tin foil. Voltage produced was sufficient, and the method could be used because of the very low current required—less than one-thousandth of a millionth of an ampere.

The complete instrument resembles an ordinary telescope except that inside, between the lenses, is the special device which converts the invisible infra-red rays into green light. The special telescope or infra-red image converter, enables a complete scene illuminated with "invisible searchlights" to be seen in all its detail.

The final signalling equipment was a small receiver weighing 1¼ pounds with self-contained power supply, which could be operated single handed with ease. Compared with this, the equivalent German equipment—*Seehund*—weighed 16 pounds without its power unit, and was no more sensitive.

First operational use of the new weapon was made in the Mediterranean in mid-1941. In combined operations raids, infra-red beacons—often small pocket-size torches—and the small hand receiver were used to maintain contact with parent ships offshore. Raiding parties reported that while reconnoitering enemy-held beaches and in imminent danger of surprise, they obtained, comforting reassurance from a momentary glance through the receiver at the waiting beacon offshore.

The three midget submarines which attacked the *Tirpitz* in Alton Fiord on 22 September 1943, were given this new weapon. The only craft to return owed its safety to infra-red.

Outstandingly successful use of the equipment was made towards the close of the war against Japan. In three midget submarine operations within a few days of each other—the attack against Japanese cruisers in Singapore Harbor and the cable-cutting operations at Saigon and Hong-Kong—the crews were greatly assisted by using this equipment, and no craft was lost.

In Europe, infra-red beacons signalled the way to freedom for escaped prisoners-of-war and gave vital contact to resistance forces, such as the Norwegian

underground movements, who were guided to safe rendezvous for supply missions.

Infra-red beacons and receivers were first fitted to night fighters in the Royal Air Force in 1942. These proved of great value in enabling our fighters to identify each other both in defensive operations and when the night fighters were accompanying our large-scale bomber raids at night over Germany. At a later date, when the bombers were fitted with radar controlled guns, infra-red equipment was also carried by the bombers to enable them to identify other friendly aircraft and insure that fire was opened only on the enemy.

In 1941, infra-red driving equipment was developed to allow transport and armored vehicles to take up positions in darkness for dawn attack, free from aerial observation. For this purpose, infra-red binocular receivers were developed, incorporating two standard infra-red tubes.

As navigational aid during the Rhine crossing in 1945, transport of the 79th Special Armored Division responsible for ferrying troops to the enemy shore was fitted with this infra-red equipment. Infra-red beacons marked points of the river entry along the river bank.

Another simple receiver was produced to detect possible enemy use of infra-red equipment and extensive infra-red reconnaissance was carried out from the air over enemy lines. Enemy infra-red equipment, however, was never used on the western front, although its restricted employment was reported during Germany's eastern offensive.

An infra-red sight for automatic weapons was also developed, but the war ended too soon for it to be used.

One of the most remarkable features of the war against Japan was the way Americans, both in and out of the naval service, misjudged the enemy. He was given credit for immense cunning and foresight in building impregnable bases, especially in the mandated islands, in preparation for his war of aggression, and it is now clear that he did not deserve this credit: the bases were improvised hastily and inadequately, and in most cases little or nothing was done until after the war had entered the defensive phase for the Japanese. On the other hand, the enemy was given no credit for technological skill. His aircraft were ridiculed—until 7 December 1941—and even after that his capital ships were laughed at as topheavy structures whose pagoda masts would cause them to capsize in a seaway.

It is now clear that the Japanese were underrated in one sphere just as seriously as they were overrated in the other, for their bid for mastery in gunnery ships produced two monsters, the *Yamato* and *Musashi*, which could not be laughed off. They were the greatest battleships the world has ever seen, or is likely ever to see. Of the three great powers remaining which can afford the luxury of capital ships, Britain is unlikely to build anything bigger than the *Vanguard;* the United States is converting the *Kentucky* to an experimental rocket-launching ship, and Russia is so situated geographically and economically that it is improbable she will build anything bigger, or more heavily gunned, than either of the western powers.

Sea Power